



The Oral Health of Native Americans

**A Chart Book of
Recent Findings, Trends and
Regional Differences**

Department of Health and Human Services
U. S. Public Health Service
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Division of Clinical and Preventive Services
Dental Field Support and Program Development Section

The Oral Health of Native Americans: A Summary of Recent Findings, Trends and Regional Differences

**Graphical Presentations of Selected Data From the
1991 Oral Health Survey of Dental Patients
Conducted by the Indian Health Service**

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This is essentially a people's contest...
it is a struggle for maintaining in the world
that form and substance of government whose
leading object is to elevate the condition of men,
to lift artificial weights from their shoulders,
to clear the paths of laudable pursuit for all -
to afford an unfettered start, and a fair chance
in the race of life.

Abraham Lincoln
Message to the Congress
July 1861

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PART 1. INTRODUCTION

Oral diseases constitute a major public health problem among Native Americans. Because common oral health problems, dental caries (tooth decay) and periodontal (gum) disease, seldom result in death or severe physical disability, the importance of controlling these conditions is often overshadowed by more disabling medical problems. However, the cost of treating oral health problems as well as the social disability resulting from poor oral health cannot be ignored, particularly in view of the fact that most oral health problems are preventable.

The purpose of this publication is to disseminate a wide range of information regarding the oral health and dental treatment needs of Native Americans to individuals and groups currently involved or wanting to become involved with community health matters. It is hoped the information presented in this chart book will be of value to Native American tribal leaders and others in stimulating effective local, regional, and national public policies for improving oral health in all communities.

Since the Indian Health Service (IHS) began its mission almost 40 years ago, to raise the oral health of Native Americans to the highest possible level, there has been little good news to report. All available data from the IHS and other sources during that time have indicated that Native Americans suffer from high rates of tooth decay, gum disease and tooth loss. This situation has occurred while the oral health of the U.S. population at large has improved. Until recently it seemed the best that could be done was to keep the "gap" between the oral health of Native Americans and the U.S. population from becoming wider.

Though the amount of IHS resources available for dental care has steadily increased, these resources have not kept pace with population growth in most regions. Without having sufficient re-

sources to provide dental care to all who need it, the IHS has used the available resources based upon established community health principles. Providing adequate access to effective preventive services and routine dental care has been the most important of these principles. It remains a crucial challenge to further improving the oral health of Native Americans.

Like the growing number of Native American communities which assume responsibility for their dental health programs, through tribal self-determination and self-governance initiatives, the IHS had limited expertise when it began operations many years ago. By hiring and training public health professionals, the IHS was able to adopt sound strategies which could produce the greatest health benefit for the greatest number of people at the least possible cost. Long-term goals for improving oral health were established and a monitoring system was started to assess progress.

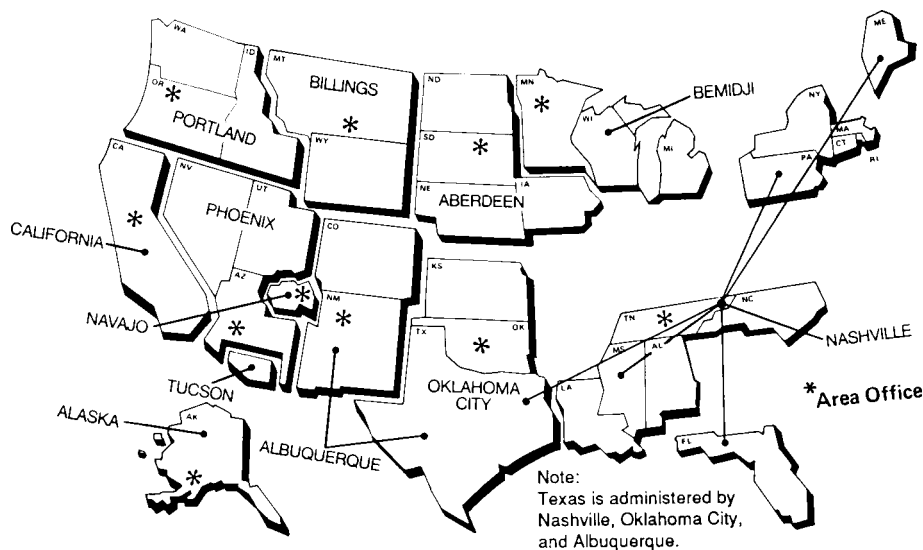
As the IHS gained experience, its strategies were modified to take advantage of new technologies and improved scientific knowledge. Efforts increased to assist communities in becoming more involved as the IHS learned that improving oral health depends upon organized community involvement. After years of diligent work, these methods have begun to pay off. Today, more communities are becoming involved and oral health appears to be improving among all ages.

This chart book highlights some of the oral health improvements that have already occurred. Future health improvement lies mainly in the hands of Native Americans themselves, as each community determines its own formula for success. By working together, the IHS and tribes can continue the trend of improved oral health in the years ahead.

Table 1.1 Glossary of Some Terms Frequently Used in this Document:

Area and Service Unit Programs:

The Indian Health Service (IHS) is composed of 12 regional administrative units called Area Offices or programs. Each Area contains local administrative districts called service units. As of 1987 there were 127 Service Units which operate over 300 health care facilities. Over 40 percent of the Service Units are operated directly by Tribes. The population of the Tucson program is relatively small compared to the other Areas. The map below provides a geographic layout of the IHS regional programs based upon state or reservation boundaries.



IHS Service Population:

American Indians and Alaska Natives identified as eligible for health services provided by the IHS. The age and sex distribution of the IHS service population is based upon data obtained from the U.S. Census Bureau using the 1990 census count of Native Americans.

IHS User Population:

American Indians and Alaska Natives eligible for health services who have used those services at least once during the last 3-year period.

Age & Sex Adjustments of the Survey Data:

A statistical method used when comparing like data from two or more study populations to eliminate differences in the observed rates of disease that result solely from differences in the age composition of each population. Adjustments are essential when the diseases being studied are age or sex related.

Table 1.2 The IHS Oral Health Monitoring System

The IHS periodically sponsors the collection of various oral epidemiologic data on dental patients in order to:

- 1. monitor general trends in oral health, disease conditions, and dental treatment patterns.**
- 2. estimate the resources required (manpower and clinics) to treat the oral health problems of Native Americans.**
- 3. plan and promote strategies to prevent or control oral health problems.**

Since 1956, the IHS has maintained a system for monitoring the oral health and treatment needs of Native American dental patients. The IHS monitoring system has provided an effective and affordable way for health program planners and community leaders to obtain a wide range of oral health information on persons of all ages. No other system exists in the United States which can periodically assess oral health among the Native American population on such a broad scale at a relatively low cost.

An important purpose of the IHS patient-based monitoring system is to detect general trends in the oral health of Native Americans at the national and the regional program level. Such trends may indicate the collective impact of various public health measures, including community water fluoridation and the availability of programs which provide education and dental care for special target populations.

Another purpose of the IHS patient monitoring system is to estimate the need for federal resources to improve the oral health of Native Americans. For this reason the dental treatment needs of patients are tracked and analyzed in relation to population growth and the increasing public "demand" for dental care. Since the needs data are collected among the population actually seeking care, estimates of resource needs are more relevant and comparable among dental programs than estimates which include many people who do not seek care at IHS or tribally-managed clinics.

Because the IHS monitoring system is limited to people who seek dental care, it is often difficult to make close comparisons with the findings from surveys of other populations. Yet, the need for these comparisons cannot be ignored when large differences in the oral health of Native Americans exist which are not explained by variations in the methods of data collection and analysis.

Table 1.3 Scope of the 1991 IHS Oral Health Survey

Almost 25,000 dental patients of all ages were examined in a period of 12 months at more than 100 IHS, Tribal and Urban Indian clinics throughout the country.

The sample was designed to make general comparisons among the 12 Area/Regional programs. Each Area's sample was balanced by age and sex groupings to represent some 350,000 Native Americans who receive care in these clinics each year.

For data analysis, patients were categorized by their recent pattern of dental care use as routine users, symptomatic users or non-local users.

The 1991 IHS monitoring survey obtained data from approximately 10 percent of the dental patients seen annually at IHS, tribal, and urban Indian clinics. All patients were examined at each participating clinic until the minimum sample size was met for every age group. Approximately 25,000 patients were examined during their first visit to the dental clinic during the 12 month survey period. IHS and tribal program dentists were trained to collect the required data according to written survey guidelines, in addition to the usual oral examination they conduct to provide care for each patient. Dental radiographs (x-rays) were not used to aid in diagnosis for the survey.

The survey sample was designed to make descriptive statistical comparisons of the findings among the 12 regional (Area) programs only. Comparisons of the findings among local (service unit) dental programs were not generally attempted due to the small samples obtained in some age groups, particularly the adults.

The need to make reliable comparisons among the Area programs is the most important factor in data analysis. The data from each Area program were reviewed and adjusted to correct for variations in age and gender among the samples which could adversely affect statistical comparisons of the findings. The oral health status data were age-adjusted to the 1991 IHS service population of each Area program, which is based upon the age distribution of Native Americans reported by the 1990 U.S. Census. However, the dental treatment needs data were age-adjusted to the age distribution of the 1991 IHS User Population, which is based upon the age distribution of patients who receive health care (medical and dental) at IHS and tribally-managed facilities. Findings from the survey, which combine data from all regional programs, were weighted according to the relative population size of each Area. To enhance data analysis, patients were categorized according to their pattern of dental care use and their access to fluoridated drinking water.

Table 1.4 Oral Conditions Monitored in the 1991 IHS Patient Survey

<u>ORAL HEALTH MEASURES</u>	<u>DENTAL TREATMENT NEEDS</u>
Tooth loss & edentulism	Diagnostic & preventive services
Untreated tooth decay	Fillings & crowns
Treated tooth decay	Endodontics
Sound & sealed teeth	Teeth needing extraction
Health factors (e.g., diabetes)	Removable dentures
Periodontal (gum) disease	Fixed bridgework
Oral trauma	Periodontal therapy
Fluoride history	Orthodontic care
Oral trauma	Access to care problems
Pathology (e.g., tobacco lesions)	

The IHS Oral Health Monitoring System captures a wide range of data which are important in planning and evaluating dental care programs. Since its inception, the IHS monitoring system has been modified periodically to address emerging dental public health issues. Prior to the 1991 IHS Patient Survey, oral health monitoring focused mainly on tooth decay among Native American children. However, numerous measures were added to the 1991 survey process to provide a better understanding of the entire oral health picture in the Native American population.

The IHS monitoring system is adapted from the basic survey methods recommended by the World Health Organization (WHO). These methods have been used by many industrialized and developing countries. The IHS system includes additional measures used in national surveys to assess various oral conditions that are important in the U.S. population. When no established method to measure a condition could be used, the IHS has devised the most practical methods to obtain the data among dental patients.

The following measures were used for the first time during the 1991 IHS Patient Survey:

Sealants - protective plastic coverings placed on the chewing surfaces of newly erupted teeth to prevent tooth decay.

Health Factors - medical conditions which affect oral health, including diabetes, use of tobacco, and dental fluorosis.

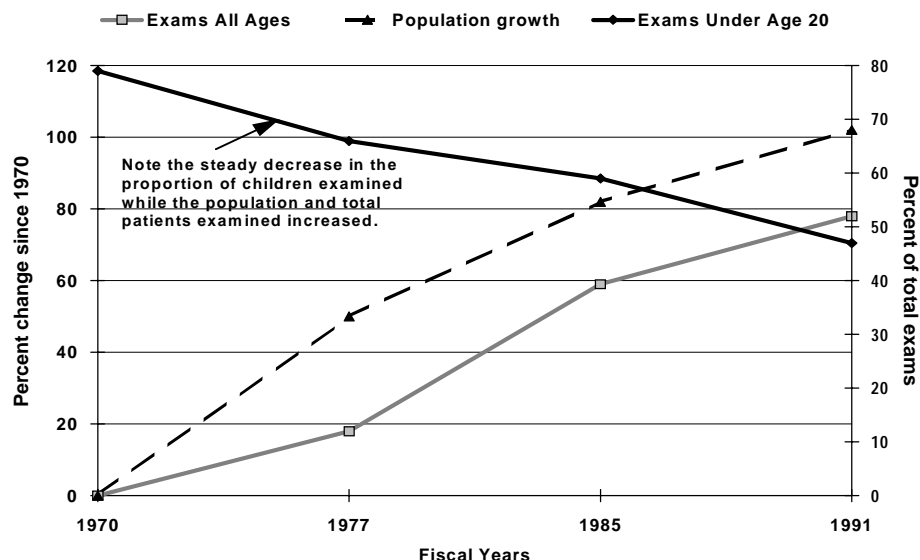
Oral Trauma - injury to permanent teeth.

Fluoride History - access to fluoridated drinking water, which prevents tooth decay.

Access to Care - level of difficulty patients have in getting dental appointments.

Findings regarding most of the oral conditions monitored in the 1991 IHS Patient Survey are presented in this chart book. The conditions which yielded the most important and reliable findings have been included. Other reports are available from the IHS which cover the conditions not discussed in this document.

Chart 1.5 IHS Service Population Growth Versus Dental Exams Reported From 1970 - 1990



The trend lines on Chart 1.5 depict the rapid growth of the Native American population in relation to the proportion of patients who received dental care annually at IHS and Tribal clinics from 1970 through 1991. The population increased by over 100 percent during the 20-year period shown, while the number of patients examined increased by 78 percent.

However, as the total number of patients who received care increased, the proportion of dental patients under age 20 steadily declined, from 79 percent in 1970 to 47 percent of all dental patients seen in 1991.

An important long-term measure of the effectiveness of IHS dental programs is the number of teeth which are extracted each year. Chart 1.6 tracks population growth, total patients examined, and the rate of tooth extractions per patient examined from 1956 to 1990 in 5-to-10-year increments.

The Native American population and the number of patients examined have steadily increased in each decade. The rate of tooth extractions per patient has declined as access to care has gradually improved. The long-term emphasis on providing adequate access to care has enabled IHS dentists to prevent tooth loss, even as the Native American population has continued to grow rapidly.

Chart 1.6 Trends in Access to Dental Care and Tooth Extractions Among IHS Programs From 1956-1990

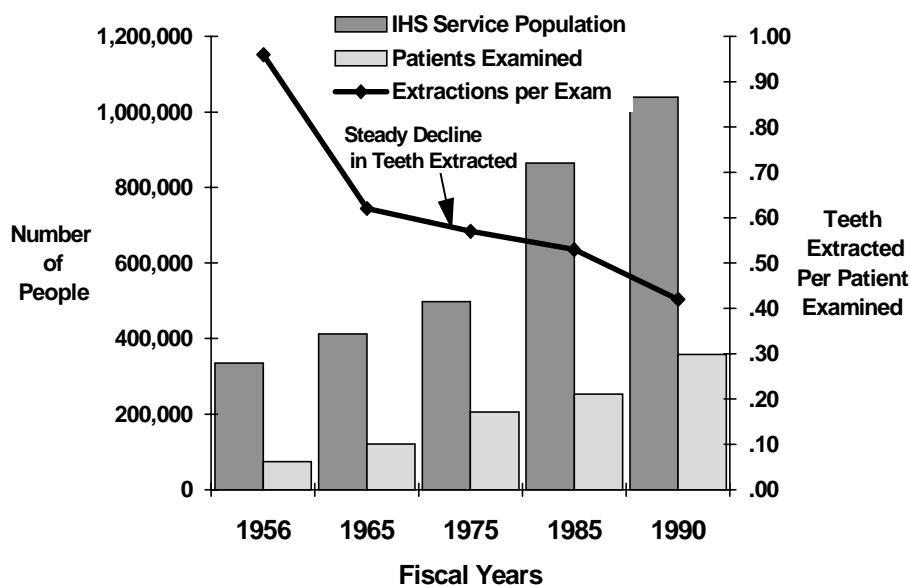


Chart 1.7 Age Distribution of the Native American Population, the IHS User Population and the 1991 IHS Oral Health Survey Sample

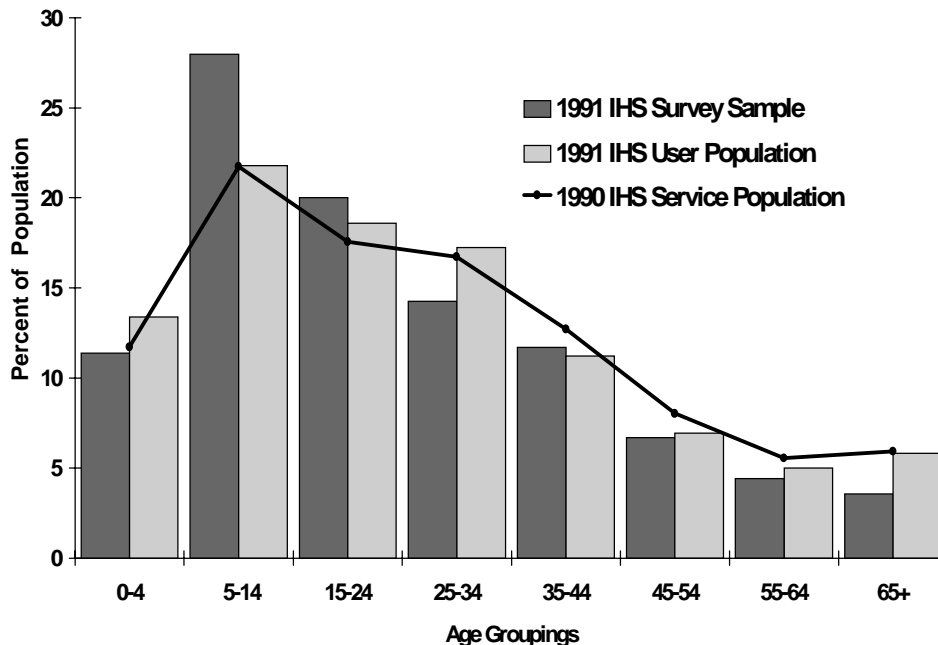


Chart 1.7 compares the age distribution of patients examined in the 1991 IHS Patient Survey with the Native American active user population and the IHS service population, which is based on the 1990 U. S. Census. The survey sample and the IHS user population included a higher proportion of children and a lower proportion of adults than did the IHS service population.

School children aged 5-14 formed a relatively high proportion of the 1991 survey sample because some Area programs "over-sampled" children to evaluate the effects of their preventive programs as thoroughly as possible.

As shown on Chart 1.8, eight of the twelve regional programs met or exceeded the minimum sampling requirement for the 1991 IHS Patient Survey. The Oklahoma and Navajo programs sampled substantially fewer patients than was planned due to technical and logistical problems, particularly in obtaining older patients. These large programs, however, were able to examine a sufficient number of patients for making statistical comparisons with the smaller Area programs. Although the Tucson program reached its sampling goal, the relatively small size of that population yielded a much smaller survey sample than all the other Area programs.

Chart 1.8 Area Sampling Results in Relation to the Total Number of Patients Needed For the 1991 Survey

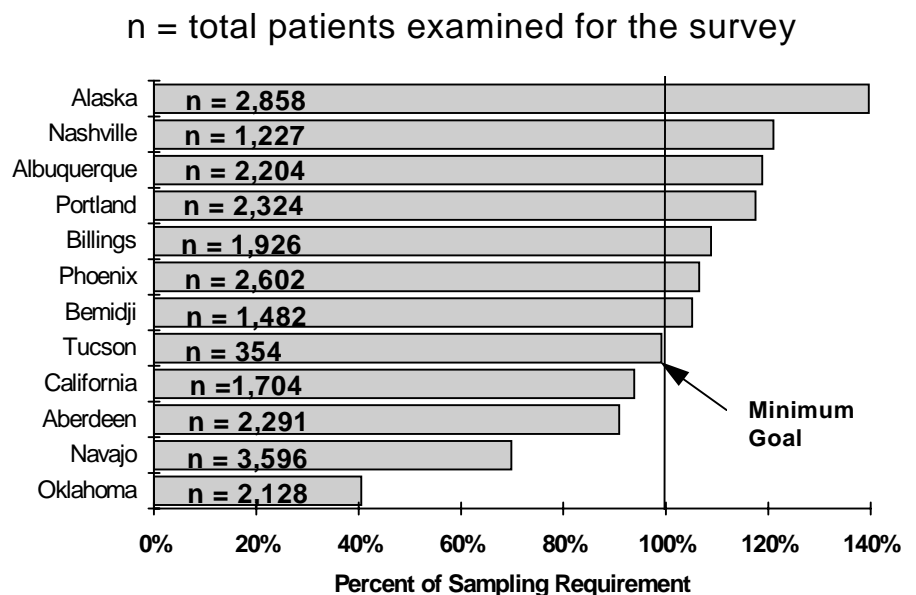


Table 1.9 Studies Used For Comparison With The IHS Survey Findings

Selected data from three recent studies of oral health in the United States are used in this chart book for making comparisons with findings from the 1991 IHS Patient Survey of oral health. The methods used in these studies differ from those used in the IHS oral health monitoring system. This factor limits the type and strength of comparisons which can be formulated. The following paragraphs provide a brief description of the design and findings of these three major studies:

The 1990 WHO International Collaborative Study (Native American sample only):

The World Health Organization (WHO) has sponsored two important International Collaborative Studies (ICS) of oral health in developing and industrialized nations. Unlike other oral health surveys, these studies were designed to examine oral health in relation to dental care systems and the cultural values and health beliefs of a population. The first ICS project, conducted in the 1970's, concluded that emphasis on school-based dental treatment systems is effective during childhood, but that it may not result in a long-term impact on oral health in a community. The ICS-I study also concluded that other factors, such as social values about oral health and the commitment of the community as well as the dental profession to implement preventive measures, such as the fluoridation of water systems, are of great importance. Based upon these findings, the IHS began to emphasize "family-based" dental care rather than school-based care programs in the 1980s. The ICS-II began in 1988 to include Germany, Japan, New Zealand, Poland and three sites in the United States. In addition to ethnic (mainly black and Hispanic) populations in Baltimore, Maryland, and San Antonio, Texas, a sample of Native Americans was included from the Navajo and Sioux Indian reservations. The ICS-II sample of Native Americans was designed to represent the "community" at large, and it was not limited to dental patients. However, the study was limited to three age groups (12-13, 35-44, and 65-74 years), representing major life stages for monitoring oral health throughout the world. Only a small portion of the ICS-II data for Native Americans collected in 1990 have been used in this publication to make comparisons with the 1991 IHS Oral Health Survey of dental patients.

The 1987 NIDR Dental Caries Prevalence Survey of U.S. School Children:

During the 1986-87 school year, the National Institute of Dental Research (NIDR) conducted the second National Dental Caries Prevalence Survey to monitor trends in tooth decay among U.S. school children. The first NIDR survey, conducted in 1980-81, detected a decline in dental caries among U.S. children when compared with findings from earlier studies. In these surveys the NIDR used well-trained dentists to examine almost 40,000 children 5 to 17 years of age at schools throughout the United States. The sample was designed to represent over 43 million school children living in urban and rural areas throughout the country. For the purposes of analysis, the U.S. was divided into seven regions. In both studies the lowest dental caries rates were found in the Southwest region and the highest in the Eastern region of the country. The NIDR also reported that children who lived in communities using fluoridated drinking water had 18 percent less tooth decay than those who had never lived in a fluoridated community. Both water fluoridation and the widespread use of fluoride-containing toothpastes were credited for the oral health improvement among U.S. school children.

(Continuation of Table 1.9)

Unfortunately, the NIDR studies did not include a sufficient sample of Native American children for separate analyses of their health.

The 1985 NIDR Oral Health Survey of U.S. Employed Adults and Seniors:

The National Institute of Dental Research (NIDR) designed the Oral Health Survey of U.S. Adults to assess the prevalence of various forms of dental caries and periodontal destruction in a readily accessible population. The sample of 15,132 employed adults and 5,686 seniors was drawn to detect changes in oral health by geographic regions of the country. Carefully-trained teams of dentists were used to examine adults at work places and at senior centers. Dental caries prevalence was estimated using the average number of decayed and filled tooth surfaces (DFS), with missing tooth surfaces being ignored. Periodontal (gum) disease was measured using the detailed Extent and Severity Index (ESI) developed by the NIDR. Because the ESI assessment is time-consuming, only half the mouth (two randomly assigned quadrants) was examined on each patient. To ensure examiner reliability, only two sites were examined on each tooth. Data included the presence of gingival bleeding, calculus (tartar), depth of periodontal pockets surrounding the teeth, and the loss of periodontal tissue attachment (in millimeters) on each tooth. The ESI system is quite different from the Community Periodontal Index of Treatment Needs (CPITN) used in the IHS monitoring surveys. Findings from the NIDR survey suggest that the oral health of U.S. adults has improved when compared with data from a household survey conducted by the National Center for Health Statistics in 1971-74. Dental caries rates (avg. D and F teeth), mild forms of periodontal disease, and edentulism also appear to have declined.

PART 2. DENTAL CARIES IN THE PERMANENT TEETH

The condition frequently called "tooth decay" is termed the disease of **dental caries** by dentists and scientists who study this widespread health problem of children and adults. It is known that dental caries rates in a population are generally related to the amount of sugar in the diet. When the consumption of sugary foods increases, disease rates soon rise. Regardless, some caries prevention programs have proven effective in controlling tooth decay in many countries, even as dietary factors drive the disease rates upward.

Recent scientific evidence has revealed a major reduction in the occurrence of tooth decay in the U.S. and in other industrialized countries, while this disease may have increased in many developing countries. The patient monitoring data collected by the IHS over the past four decades suggests that until recently dental caries rates in the permanent teeth of Native American children have gradually increased and remained at a very high level. Now, the long-term public health strategies to prevent tooth decay in Native American communities are having a substantial effect on the disease rates among children and adults.

For many years community water fluoridation has served as the most cost-effective public health measure to prevent dental caries. It is credited as a major reason behind the dramatic decline in tooth decay among most children in the U. S. Though many larger cities have fluoridated drinking water, it has been difficult to accomplish in small rural communities, such as those on Indian reservations. Since 1980, the IHS and many tribal governments have strengthened their efforts to improve access to water fluoridation in all Native American communities where it was needed. Substantial progress has been made since that time. In the mid-1980s the IHS also began to emphasize the use of protective sealants on the

teeth of children as an additional way to combat high tooth decay rates among children in fluoridated and non-fluoridated communities.

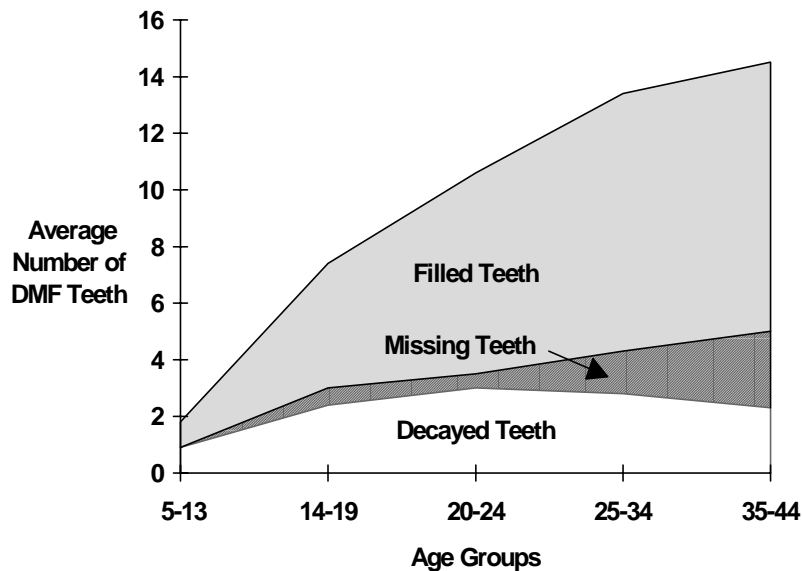
Despite these efforts, dental caries rates in the permanent teeth of Native American children remain higher than the decay rates found among other U.S. children. Further progress in reducing these rates depends upon the continuation and expansion of health resources to support effective preventive programs. Population growth is another factor which continues to increase the need for caries preventive resources in most Native American communities.

Dental caries data are collected in surveys by using the widely-accepted **DMF index**. It counts the number of decayed (D), missing due to decay (M) and filled (F) teeth or tooth surfaces found in the mouth of each person examined. Thus, the DMF index measures the cumulative dental caries experience of individuals in terms of untreated and treated disease. The number of DMF teeth in a population increases with age. As adults lose teeth to periodontal disease, the DMF index becomes less useful for monitoring tooth decay.

Trends in dental caries rates are often analyzed in two ways. The **distribution of disease in a population** compares the proportions of persons who have a low, moderate, or high number of DMF teeth (or surfaces) relative to their age. It measures the number (or percent) of persons affected. The **amount of disease in a population** is monitored by comparing the average (or mean) number of DMF teeth per person by age. It measures precise changes in the rate of new disease (incidence) in a given age group over a period of time. It is important to monitor both the percent distribution and average number of DMF teeth in Native American communities.

Chart 2.1 Tooth Decay In the Permanent Teeth of Native Americans by Age

(Average DMF Teeth Among Patients Aged 5-44 Years Examined in the 1991 IHS Oral Health Survey)



In all populations, the average number of decayed, missing and filled teeth (DMFT) increases with age. Effective preventive measures can minimize the general rise in the DMFT. Early treatment can reduce the need for costly repair or tooth loss.

It is important for community dental programs to monitor changes in tooth decay rates by tracking the overall disease level (DMFT), as well as the relative proportions of decayed (D), missing (M), and filled (F) teeth. Even if dental caries rates do not decline over time, the average number of missing and decayed teeth should still be reduced by providing adequate access to dental care for children and adults.

Chart 2.2 compares the average decayed, missing, and filled permanent teeth (DMFT) by age in the 1984 and 1991 IHS surveys. The findings indicate the rate of dental caries has declined in each age group since 1984. Children experienced the greatest reduction in DMF teeth, ranging from 47 percent for those aged 5-13 to 36 percent among those aged 14-19 years.

These findings suggest that adults and children have benefited from the progress made by tribal and IHS programs in providing sealants and water fluoridation during the past decade. An analysis of the probable benefits of fluoridation, based upon the average rate of DMF tooth surfaces, is discussed with the data on Chart 2.12.

Chart 2.2 Comparison of Dental Caries Rates In Permanent Teeth Reported In the 1984 and 1991 IHS Surveys

(Average DMF Teeth Among Patients Aged 5 to 44 Years)

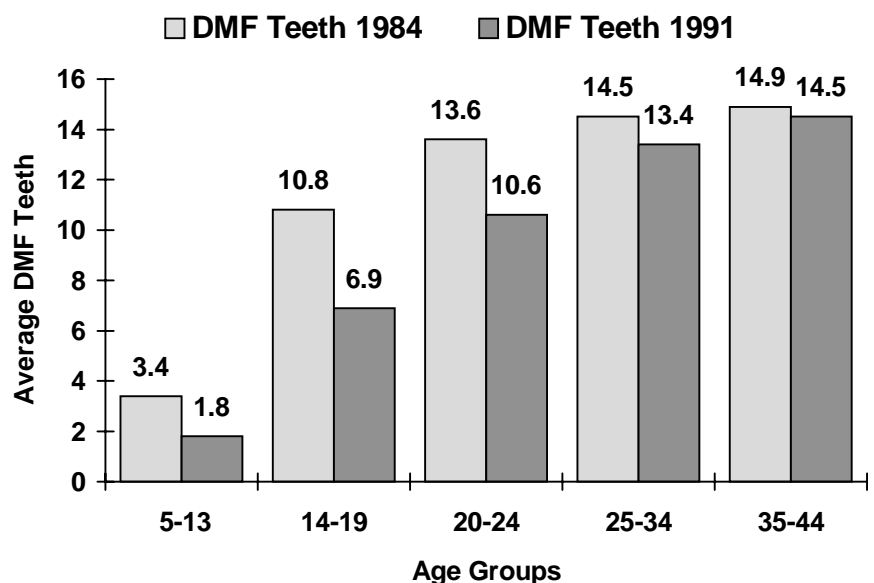


Chart 2.3 Trends in Decay of Permanent Teeth of Native American Children Based on the IHS Monitoring System From 1957-1991
(Average DMF Permanent Teeth Among 5-19 Year-olds)

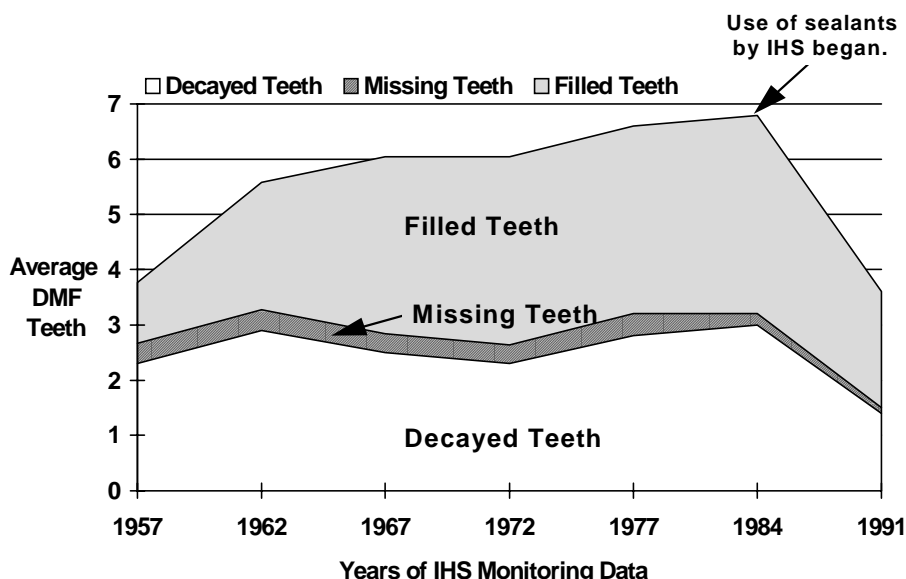


Chart 2.3 presents patient data gathered by the IHS from 1957 to 1977, as well as from the 1984 and 1991 IHS patient surveys. The increase in DMF teeth from 1957 through 1977 is associated with a steady rise in the number of filled teeth. That trend may reflect the historical effect of school-based programs which often treated early signs of decay with “preventive fillings” before protective sealants became available to dentists.

The dramatic reduction in the average DMF rate after 1984 results largely from the widespread use of sealants on permanent molar teeth. These teeth account for the majority of tooth decay among children.

Chart 2.4 provides a historical picture of decay rates among 12- to 13-year-olds. Prior to the IHS monitoring system, little data were available regarding the DMFT rates among Native American children. A large survey of Indian boarding schools from 1929-32 indicated that tooth decay rates were much lower (avg. DMFT =2.4) than the 4.1 DMFT rate reported when the IHS began monitoring in 1957.

The community-based sample of Native Americans in the 1990 WHO Study (Aberdeen and Navajo only) had 2.7 DMFT per 12- to 13-year-old. This rate is similar to that of rural U.S. school children (2.7) examined in the 1987 NIDR national survey.

Chart 2.4 A Historical Comparison of Dental Caries Among Native American Children From Various Surveys
(Average DMF Teeth Among 12 and 13 Year-olds)

<u>Year</u>	<u>Description of Survey</u>	<u>DMF Teeth</u>
1929-32	Survey of Boarding Schools	2.4
1957	IHS Annual Monitoring (begins)	4.1
1977	IHS Annual Monitoring (ends)	6.6
1984	IHS Patient Survey #1	6.5
1990	W.H.O. Study (Aberdeen, Navajo)	2.7 ←
1991	IHS Patient Survey #2	3.6
<hr/>		
1986-87	U.S. School Children (NIDR)	1.8
	Rural Children (NIDR, non-SMSA)	2.8 ←

The apparent decline in tooth decay among Native American adults was first noted after the 1984 IHS Patient Survey, when the average DMFT rate among 25- to 34-year-olds was compared with the DMFT data collected by the IHS in 1970. Chart 2.5 updates this comparison with findings from the 1991 IHS Patient Survey.

These data suggest there has been a steady decline in the rate of tooth decay among younger adults since 1970. The data also reflect improved access to dental care for adults during that time. The average DMF teeth dropped more than 20 percent between 1970 and 1991, while the number of filled (F) teeth increased by almost 40 percent. The decayed (D) and missing (M) teeth steadily decreased.

This age group appears to have benefited from progress in fluoridating community water systems and better access to dental care. Changes in the oral health practices of this age group (e.g. the use of fluoride toothpaste) may have also played a role in this encouraging health trend.

Some adults examined in 1984 and 1991 were among the last to receive dental care each year from the IHS in school-based dental health programs. Some of the improvement in oral health among this age group may be a lasting effect of those school-based treatment programs.

Chart 2.5

Trends in Dental Caries Among Native American Adults: 1970, 1984, and 1991

(Average DMF Teeth Among 25- to 34-year-olds Reported in the IHS Monitoring Systems)

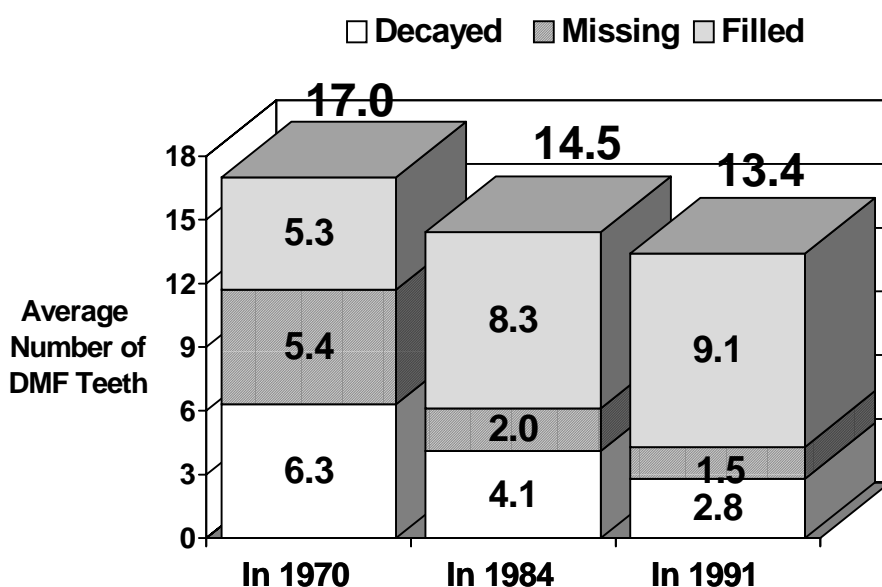
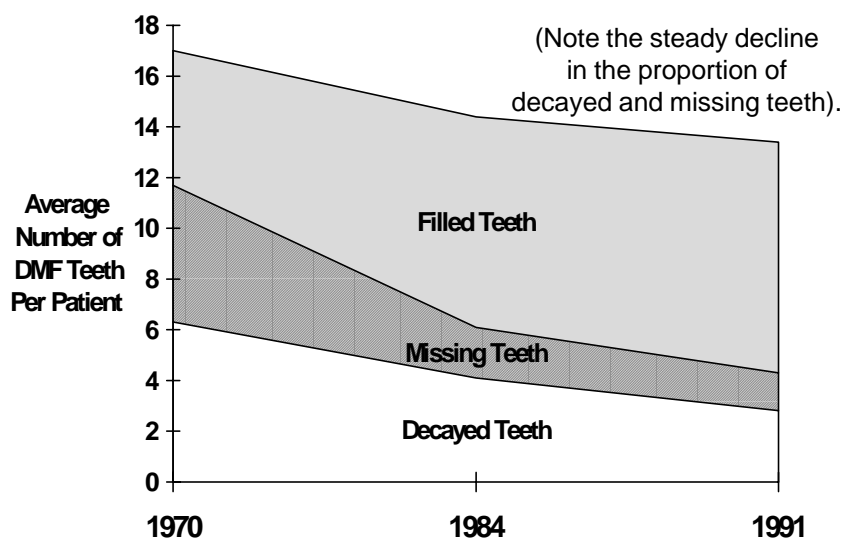


Chart 2.5b

Relative Differences in Dental Caries Rates Among 25- to 34-year-old Native American Dental Patients in 1970, 1984 and 1991

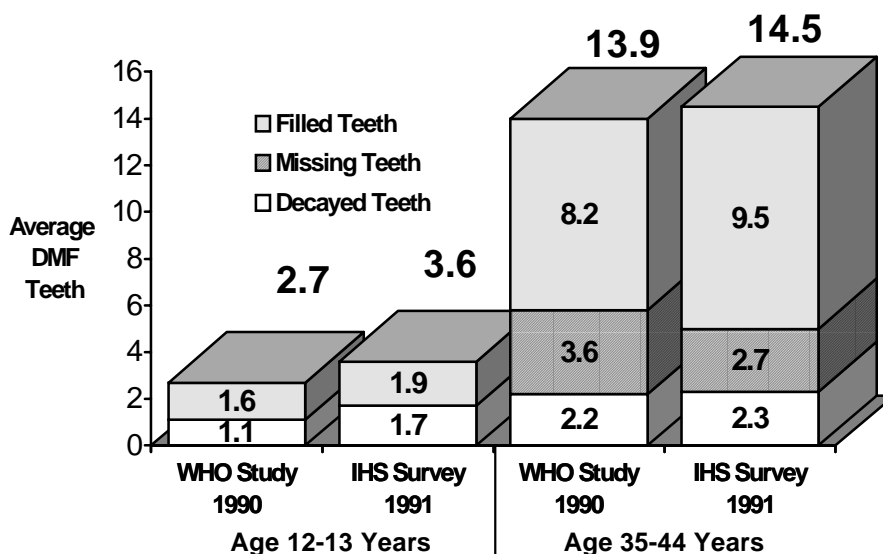


It is important to know if the disease rates reported from dental patient surveys represent the community population at large. Because the 1990 WHO Study included a "community-based" sample of Native Americans in two Area programs, comparisons were made with the 1991 IHS Patient Survey results from the same communities used in the 1990 WHO Study.

Chart 2.6 indicates the IHS patient sample of 12- to 13-year-olds averaged almost one more DMF tooth (3.6) than the WHO Study community-based sample (2.7). Among 35- to 44-year-olds, IHS patients averaged more filled teeth (9.5 vs. 8.2) and fewer missing teeth (2.7 vs. 3.6) than adults in the community-based sample. The average rate of DMF teeth (14.5 vs. 13.9) and the number of decayed teeth (2.3 vs. 2.2) were similar among patients and the community-based sample.

Chart 2.6 Comparison of Dental Caries Among Dental Patients Versus the Community

(Average DMFT Among Native Americans Aged 12-13 and 35-44 in the 1990 WHO Study and the 1991 IHS Patient Survey)



Though the sample in the 1990 WHO Study was limited to the Navajo and Sioux Indian populations, both groups are representative of Native Americans living on reservations elsewhere. Neither the Aberdeen or Navajo

programs reported the highest disease rates in permanent teeth among all the Areas, yet every Area program reported high caries rates compared to the U.S. population.

In the community-based WHO Study and the IHS Patient Survey, the Aberdeen Area averaged higher disease rates than did the Navajo Area (see *Data Detail*). The 12- to 13-year-old patients examined by the IHS at the WHO Study sites in 1991 averaged higher DMFT rates than the community-based sample, despite evidence of sealant use. Among adult patients examined at the WHO Study sites in 1991, Aberdeen averaged substantially more missing teeth (3.8) than did patients in the Navajo Area (1.8).

Data Detail: Comparison of dental caries rates in the 1991 IHS Patient Survey sample and in the 1990 WHO Study community-based sample.

Age 12-13		Dental Caries Rates					
Sample of Native Americans	N	Sealed Mean	D Mean	M Mean	F Mean	DMFT Mean	F/DMF Percent
1990 WHO Study	95	?	1.1	.05	1.6	2.7	59
1991 IHS Survey:	1,363	4.5	1.7	.04	1.9	3.6	53
Aberdeen WHO Sites	68	5.5	2.2	.10	2.2	4.5	49
Navajo WHO Sites	111	7.7	1.8	.04	1.9	3.7	51

Age 35-44		Dental Caries Rates					
Sample of Native Americans	N	Sealed Mean	D Mean	M Mean	F Mean	DMFT Mean	F/DMF Percent
1990 WHO Study	807		2.2	3.6	8.2	13.9	59
1991 IHS Survey:	2,899		2.3	2.7	9.5	14.5	65
Aberdeen WHO Sites	139		2.2	3.8	8.3	14.3	58
Navajo WHO Sites	144		2.6	1.8	8.3	12.7	65

Chart 2.7 Comparison of Tooth Decay Among U.S. School Children and Native Americans

(Age-adjusted Mean DMF Tooth Surfaces Among 5- to 17-year-olds in the 1991 IHS Survey and 1987 NIDR Survey)

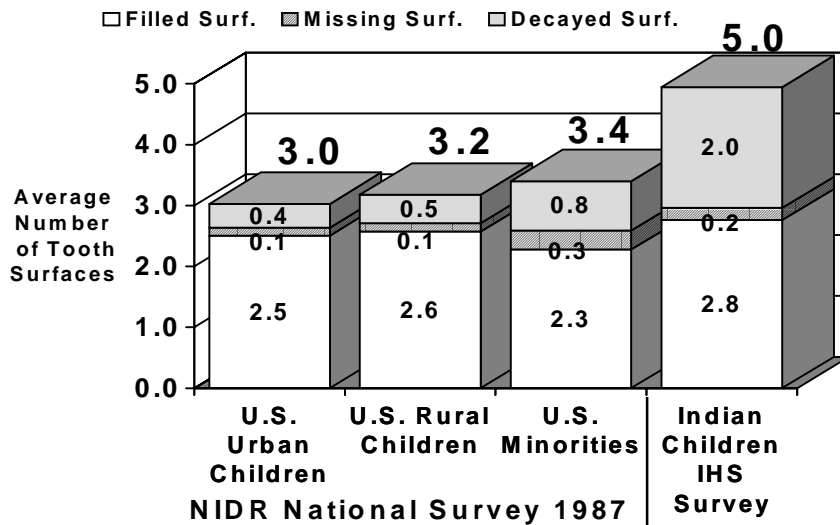


Chart 2.7 compares the average number of DMF surfaces in permanent teeth of Native American children examined in the 1991 IHS Patient Survey. The findings have been age-adjusted to the sample of U.S. school children surveyed by the NIDR in 1987.

Among U.S. children, minorities (mainly blacks and those living in rural areas) averaged DMFS rates higher than the urban children. The Native American children averaged substantially more decayed tooth surfaces (2.0) than did any group of U.S. school children (.4 to .8 surfaces).

On Chart 2.8 Native Americans aged 35-44 averaged more decayed and fewer filled teeth in the 1990 WHO Study and the 1991 IHS Patient Survey when compared with U.S. employed adults in 1985 (NIDR). The Native American adults averaged over three times as many decayed teeth (1990 WHO Study = 2.2 vs. 1991 IHS patients = 2.3) as did the U.S. population (0.6) as did the U.S. population (0.6) did in 1985. Since missing teeth are excluded, these findings underestimate the full rate of disease among Native American adults.

In 1991, the IHS patients averaged more filled (9.5 vs. 7.6) and fewer decayed (2.3 vs. 3.5) teeth than were reported in 1984. Even so, the findings point out the high rate of new decay among adults and a backlog of untreated disease due to limited access to care.

Chart 2.8 Comparison of Dental Caries Among U. S. Adults and Native Americans

(Average Decayed and Filled Teeth Among 35- to 44-year-old U.S. Adults in 1985 and Native Americans in the 1990 WHO Study and the 1984 and 1991 IHS Patient Surveys)

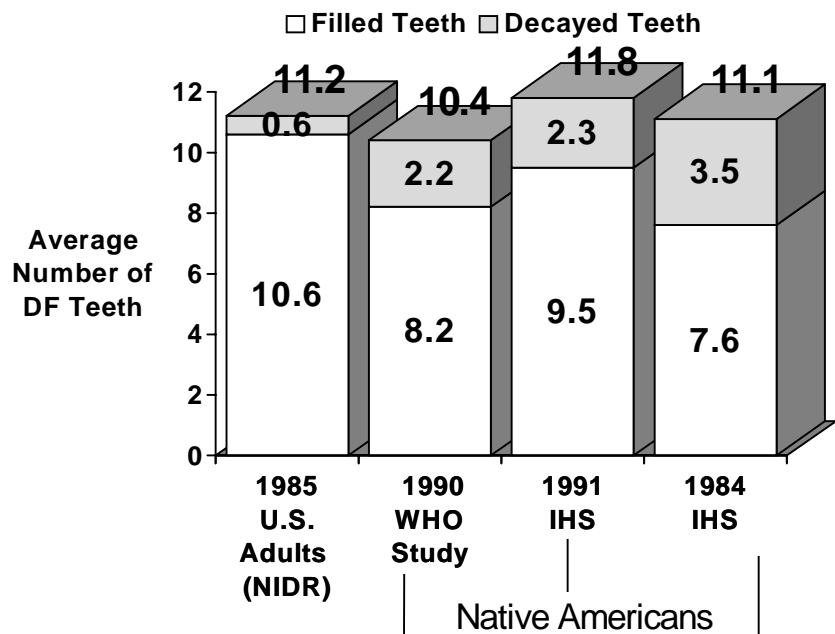
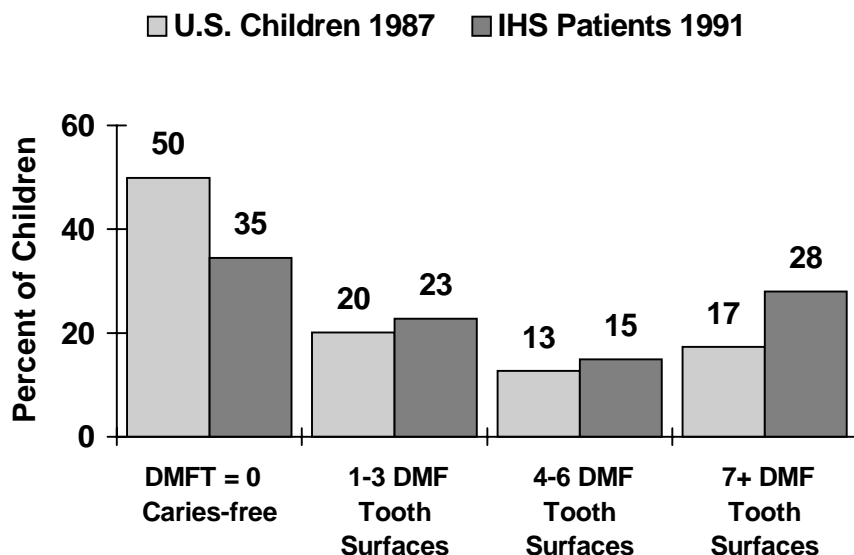


Chart 2.9 The Distribution of Dental Caries Among Native American Children and U.S. School Children:

(Percent of 5- to 17-year-olds by the Number of DMF Surfaces: 1987 NIDR Survey and 1991 IHS Patient Survey)



The percent distribution of DMF teeth or tooth surfaces among children provides a simple way to track the relative proportions of children who experience low, moderate, or high levels of disease. These proportions are particularly important to monitor as dental caries rates decline.

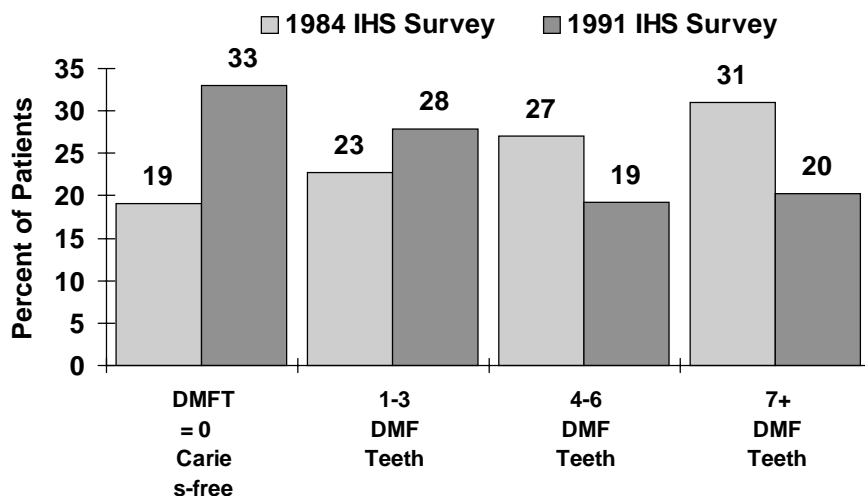
Chart 2.9 shows that, among 5- to 17-year-old Native American patients in 1991 and U.S. school children surveyed by the NIDR in 1987, a much larger proportion of Native American children had 7 or more DMFS (28 %) than did other U.S. children (17 %). Also, a smaller proportion were found to be caries-free (34 %) than were the U.S. school children (49 %) in 1987.

The distribution of DMF teeth among 5- to 19-year-olds examined in the 1991 IHS Patient Survey showed marked improvement over the distribution of dental caries reported in the 1984 IHS Survey. One-third of the children (33 %) were caries-free (DMFT = 0) in 1991, compared to less than one in five children (19 %) in 1984. Also, 31 percent had 7 or more DMF teeth in 1984 compared to 20 percent in 1991.

Because the number of DMF permanent teeth rises with age, the proportion of 5-19 year-olds with 7+ DMF teeth in this analysis is comprised mainly of the older children.

Chart 2.10 The Distribution of Dental Caries Among Native American Children In the 1984 and 1991 IHS Patient Surveys

(Percent of 5- to 19-year-old Patients Having: 0, 1-3, 4-6, or 7+ DMF Teeth)



It is difficult to assess the total benefit of water fluoridation on oral health in Native American communities over the past decade. The recent widespread use of sealants on the chewing surfaces of teeth complicates comparisons between the 1984 and 1991 IHS survey findings. Since dental caries data for each tooth surface were not collected prior to the 1991 survey, little can be determined by using earlier data gathered by the IHS.

For these reasons, the health benefit analysis for water fluoridation focused on the rate of proximal surface decay among patients examined during the 1991 survey in relation to their "fluoride history" (see details to the right). Proximal tooth surfaces are those which touch between two adjacent teeth.

The data on Table 2.11 compare the average total DMFS and proximal DMFS by age among patients having a positive or negative fluoride history. The results indicate that patients with access to fluoridated water averaged a lower rate of proximal surface decay in each age group. Chart 2.12 summarizes the differences in DMFS rates as the percent reduction in proximal surface decay attributable to water fluoridation. Children aged 15-19 had the greatest reduction (31 %) because adults experienced most of their tooth decay before water fluoridation was generally available.

Table 2.11 Comparison of Dental Caries Among Patients by Age and Fluoride History

(Average DMFS and Proximal DMFS Among Patients Aged 5-44 by Their Fluoride History in 1991)

		Proximal			
		Total DMFS	Surface DMFS	Percent Reduction in Average DMFS	
<u>Age 5-14</u>	<u>Sample</u>	<u>Avg.</u>	<u>Avg.</u>		
Fluoridated Water	2,311	5.4	0.5	All DMFS	Proximal DMFS
No Fluoridation	1,296	5.5	0.5	1.8 %	0.0 %
<u>Age 15-19</u>					
Fluoridated Water	1,400	13.3	2.4	All DMFS	Proximal DMFS
No Fluoridation	733	14.9	3.5	10.7%	31.4 %
<u>Age 20-34</u>					
Fluoridated Water	3,030	27.7	8.9	All DMFS	Proximal DMFS
No Fluoridation	1,680	29.7	10.4	6.7%	14.4%
<u>Age 35-44</u>					
Fluoridated Water	1,569	39.5	15.8	All DMFS	Proximal DMFS
No Fluoridation	88	42.2	17.6	6.4%	10.2%

How the fluoride history was assessed:

Each patient's access to fluoridated drinking water was carefully determined. Patients who had access to fluoridated drinking water in at least 3 of the previous 5 years were categorized as having a positive history (yes), while others were classified as either negative (no) or undetermined. In addition to querying patients, the dentist examiners were encouraged to use fluoridation surveillance records from the water systems in their Service Units.

Chart 2.12 Percent Reductions in Tooth Decay in Permanent Teeth of Native Americans Due to Community Water Fluoridation

(Percent Fewer DMFS Tooth Surfaces Among Patients Using Fluoridated Water By Age in 1991)

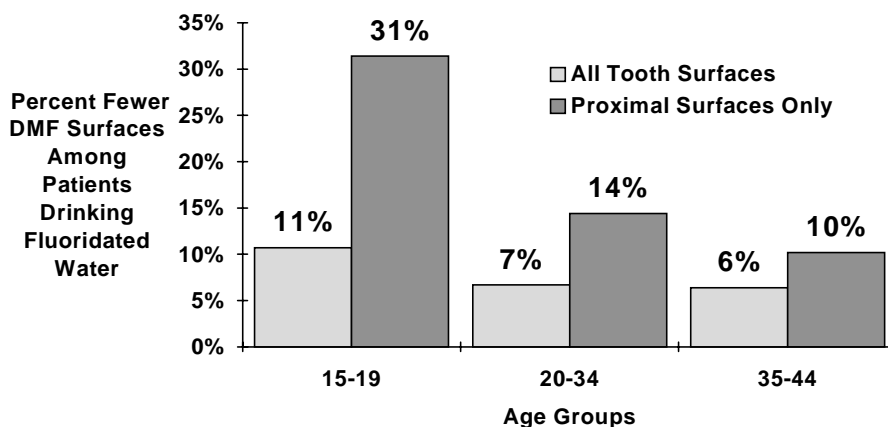


Chart 2.13 Recent Progress in the Fluoridation of Native American Communities: 1985 - 1991

(Based on the Average Number of Water Systems Being Monitored by Tribal and IHS Programs Each Month)

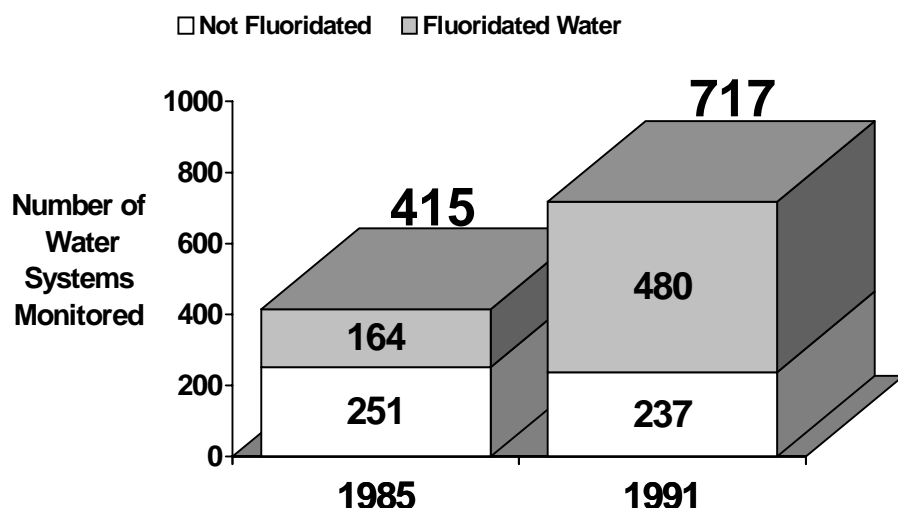
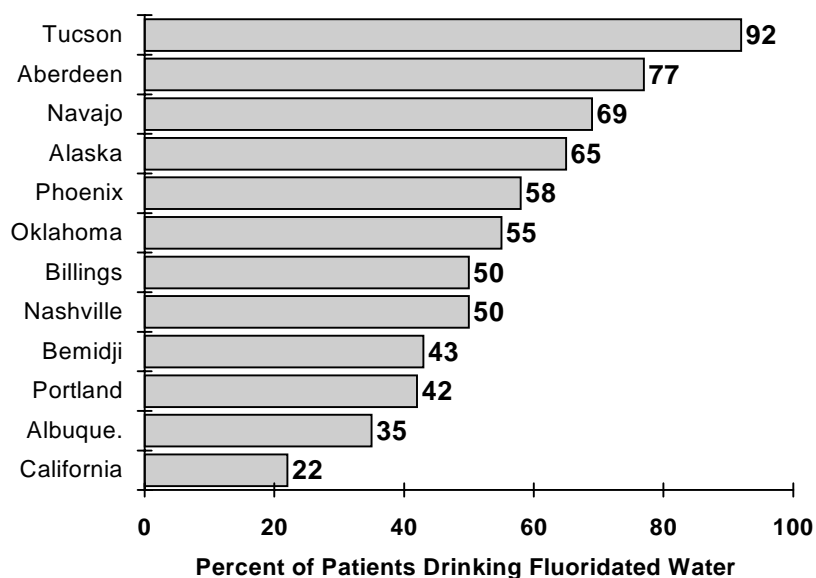


Chart 2.13 compares the number and status of water systems in Native American communities tracked by the IHS Fluoridation Compliance Surveillance System in 1985 and 1991. Compliance is based upon the routine reporting from each water system within an acceptable fluoride level.

The number of water systems being tracked increased by 73 percent from 1985 to 1991 (from 415 to 717). During the same time the number of fluoridated water systems in compliance increased by almost three fold (from 164 to 480). The proportion of water systems in compliance increased from 40 percent in 1985 to 67 percent in 1991. Despite this progress, the IHS has estimated less than 60 percent of the Native American population had access to fluoridated water on tribal lands in 1991.

Chart 2.14 Percent of Dental Patients Using Fluoridated Water by Area Program in 1991

(Based Upon Each Patient's Fluoride History As Assessed In the 1991 IHS Patient Survey)



The analysis in Chart 2.14 includes patients using naturally-fluoridated water and water systems to which fluoride is added. The proportion of dental patients having access to fluoridated water among all Areas combined was approximately 55 percent.

Natural water fluoridation contributes substantially to the high rate reported by the Tucson program (92 %). California's low rate (22 %) underscores the difficulty which many rural tribal programs face in establishing access to fluoridated water in their communities.

Chart 2.15 Dental Caries Rates in Permanent Teeth of Children by Area Program in 1991

(Average DMF Tooth Surfaces Among 5- to 17-year-olds, Age-adjusted to U.S. Child Population)

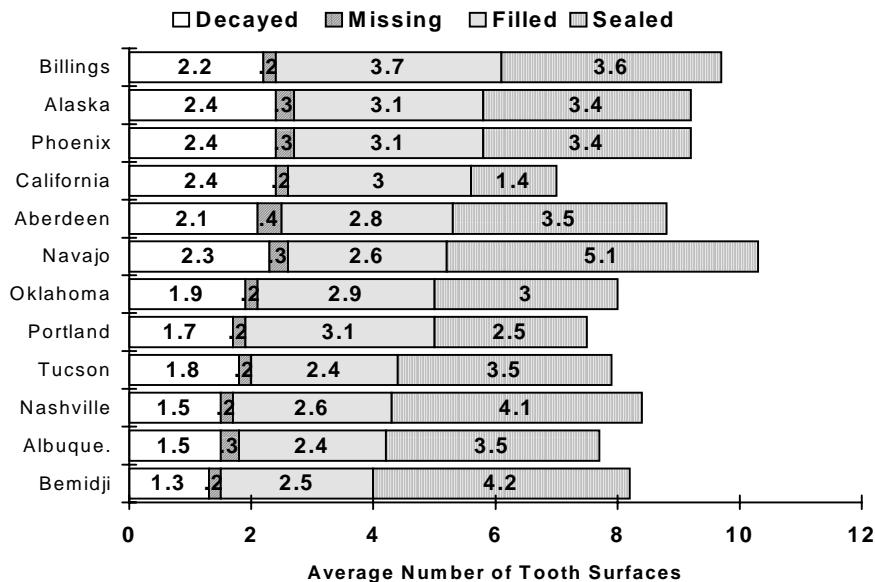


Chart 2.15 lists the Area programs in descending order by the average number of DMF tooth surfaces per 5- to 17-year-old examined in the 1991 IHS Patient Survey. The average number of sealed surfaces is given in addition to DMFS rates.

There is not a consistent relationship between the rate of sealed surfaces and the DMFS rates among the Areas. As the number of sealed surfaces increases, the number of DMF surfaces is not always lower. This may reflect differences in disease among older children who experience decay on surfaces which could not be sealed.

Chart 2.16 shows that all Area programs reported a substantially lower rate of DMF teeth per child in 1991 than they reported in the 1984 IHS Patient Survey. Children in the Alaska and Portland Areas had the highest rates in 1984, whereas the Billings and Alaska Areas reported the highest rates in 1991. No data were reported for the Tucson program in the 1984 Patient Survey.

The dramatic decrease since 1984 results mainly from the use of protective sealants on molars. Despite the improvement, the average DMFT rates remain higher than the average 1.9 DMFT found among U.S. school children by the NIDR in 1987.

Chart 2.16 Comparison of Caries Rates by Area Program in the 1984 and 1991 IHS Surveys

(Average DMF Teeth Among 5- to 19-year-olds)

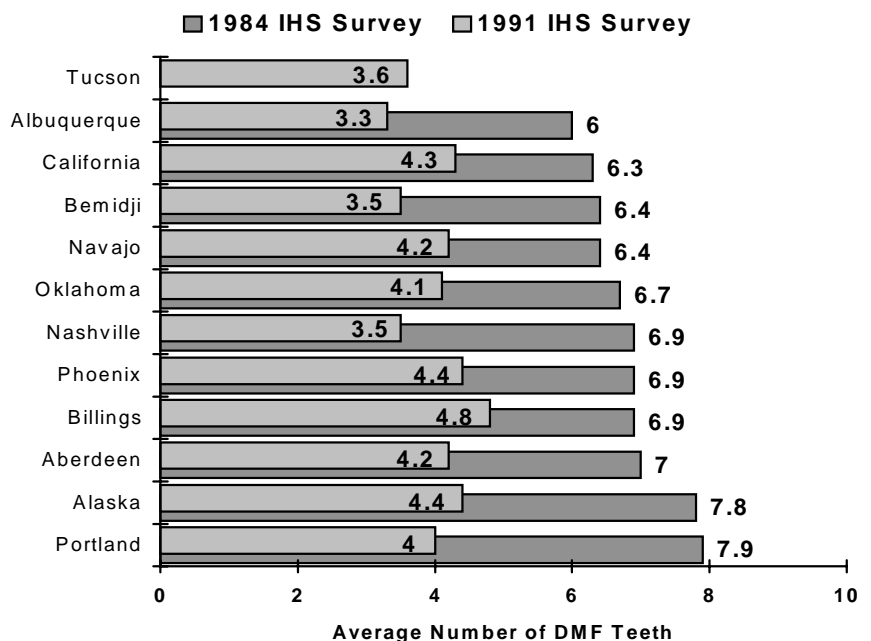


Chart 2.17 Distribution of Dental Caries Among Native American Children by Area Program in 1991

(Age-adjusted Percent of 5- to 19-year-olds Having "0" or 7+ DMF Teeth)

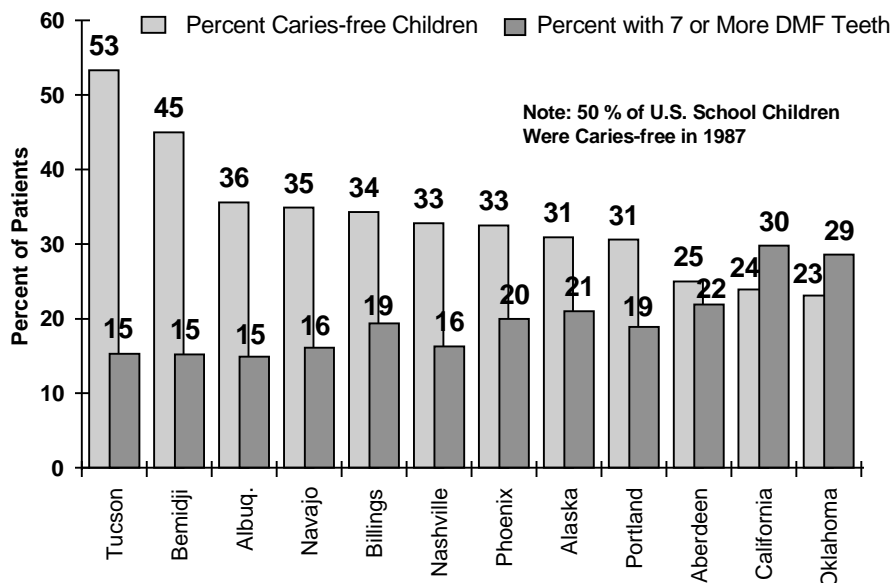


Chart 2.17 lists the Area programs in descending order by the percent of 5- to 19-year-olds who were caries-free (0 DMFT) in 1991. The proportion of children having a high rate of tooth decay (7 or more DMF teeth), is overlaid for comparison.

Most programs of the Southwest (Tucson, Albuquerque, Navajo) reported the lowest disease rates, a regional pattern observed for many years. Some 54 percent of the children in the Tucson program were caries-free, while only 15 percent had 7 or more DMFT. Children in Oklahoma and California were situated at the highest level of this disease distribution scale.

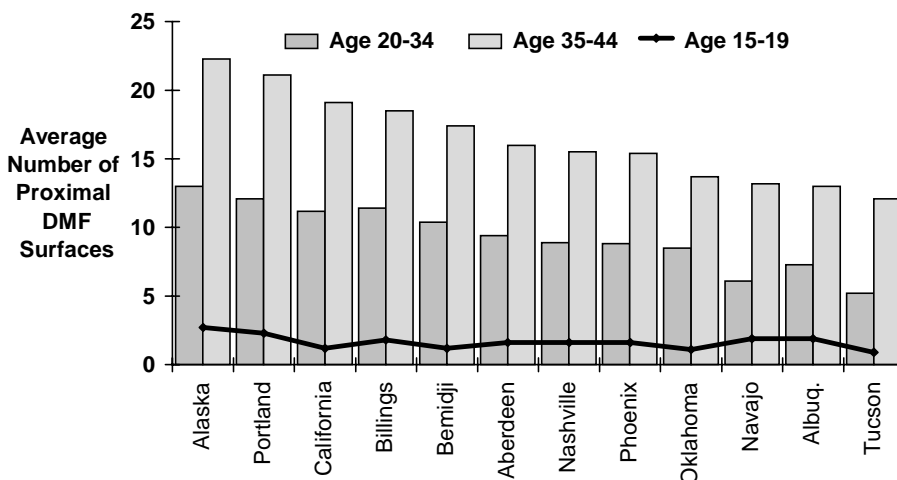
Chart 2.18 shows the rate of proximal surface decay (mean DMFS) reported among 15- to 44-year-olds by Area program in 1991. It depicts long-standing regional disease patterns and perhaps an alarming new trend.

Among adults aged 20-34 and 35-44 years, programs in the Southwest, reported the lowest rates, while the tribes of the Pacific Northwest average the highest rates of proximal decay. This regional pattern has been observed in the IHS monitoring system for many years. However, among the 15- to 19-year-olds, the DMFS rates suggest that proximal surface caries rates in the Navajo and Albuquerque programs may be rising.

Chart 2.18 Proximal Tooth Surface Decay Rates In Permanent Teeth by Age and Area Program in 1991

(Average DMFS Proximal Tooth Surfaces Among Patients Aged 15-19, 20-24, and 35-44)

Note: Proximal surfaces are those which touch each other between two adjacent teeth.



PART 3. DENTAL CARIES IN THE PRIMARY TEETH

The "baby teeth" or **primary dentition** plays an important role in oral health during the first decade of life. They erupt sequentially into the mouth before age 3 years. These 20 teeth are naturally replaced by the permanent teeth from ages 5 through 12 years. The primary teeth must save space in the mouth for permanent teeth to erupt. When primary teeth are extracted prematurely due to decay, orthodontic problems (the need for braces) and speech problems may result. Thus, effort is made to keep primary teeth in the mouth until they are lost at the proper age.

Like the permanent teeth, dental caries rates in the primary teeth are monitored by counting the number of decayed (d), missing (m) and filled (f) teeth (**dmft**) or surfaces (**dmfs**). Lower case letters are always used to indicate primary teeth. Population surveys do not attempt to measure missing (m) primary teeth after age 4 years because these teeth begin to be lost naturally after that age. The use of sealants has not been monitored in primary teeth, but future IHS patient surveys may do so.

The 1984 IHS Patient Survey raised awareness about a major problem among Native American children: **Baby Bottle Tooth Decay (BBTD)**. This often severe form of dental caries in infants and toddlers results from inappropriate use of the nursing bottle after the primary teeth begin to erupt. It is believed BBTD has caused exceptionally high dental caries rates in the primary teeth of Native American children for many years. The diet of preschool age children also is a large factor fueling the decay of primary teeth.

The high disease rates among young children cause much pain and suffering in Native American communities each year. Treatment of these teeth consumes a large amount of the program resources available to meet the dental health

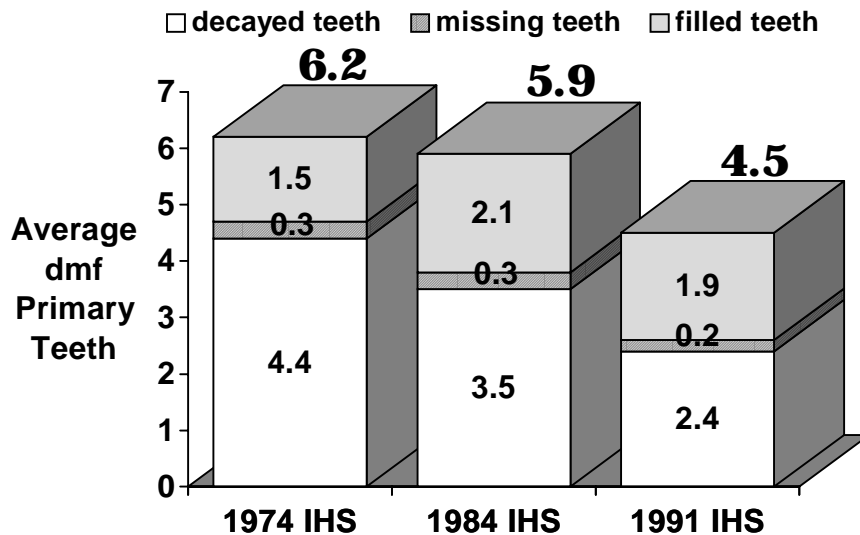
needs of all patients. Because BBTD occurs before a child normally visits the dental clinic, dentists can do little more than provide "damage control" treatment to prevent tooth loss. Thus, the dental caries problem in primary teeth must be solved through long-term, collaborative effort among all persons involved in the care of infants, young children, and their families.

After the 1984 Patient Survey, the IHS began extensive efforts to assist communities in controlling the BBTD problem. A five-year study begun in 1990 to test several intervention methods produced positive results after only three years. Since then, many IHS and tribal health programs have started special initiatives to improve the oral health of young children. Because protective sealants can do little to reduce the caries problem among children under 3 years of age, studies are under way to test new preventive agents which can be applied to the teeth of infants.

Although recent progress in water fluoridation appears to have produced some benefit for the primary teeth, most experts feel that the caries preventive benefit of fluoride is very limited when harmful nursing or feeding habits are practiced. Even though nursing habits may initiate tooth decay by age 2, the severity of disease can be influenced strongly by harmful dietary habits after the nursing bottle is discontinued. Thus, the feeding habits of children above age 2 should be of as much concern to parents as the prevention of BBTD. For this reason, many IHS and tribal dental programs place emphasis on providing preventive care, education and treatment to the thousands of Native American children enrolled in the Head Start programs each year. After more than a decade of collaborative effort, the oral health of preschool children is beginning to show signs of improvement.

Chart 3.1 Trends in Tooth Decay in the Primary Teeth of Native American Children: IHS Monitoring Data in 1974, 1984, 1991

(Age-adjusted Average Number of dmft Teeth Among Patients Aged 0-9 Years)



On Chart 3.1, the results from the 1984 IHS Patient Survey reported an average tooth decay rate (5.9 dmft) per child similar to that reported by the IHS in 1974 (6.2 dmft). The increase in filled teeth during that time, from 1.5 to 2.1, may reflect emphasis on access to care for children attending Head Start programs after 1974.

The 1991 IHS survey findings produced a lower tooth decay rate (4.5 dmft) when compared with the 1974 IHS data (6.2 dmft). Though the rate of primary teeth extracted (missing) for decay shows little change, the average number of decayed (d) teeth decreased by two teeth per child, from 4.4 to 2.4, since 1974.

The downward trend presented in Chart 3.1 is overshadowed when the decay rates in primary teeth of Native American children are compared with those of U.S. school children. Chart 3.2 shows that the average dfs among 5- to 9-year-old Native American children examined by the IHS in 1991 was 2 to 3 times as high at each age as that of U.S. children surveyed by the NIDR in 1987.

The average number of df surfaces peaks before age 5 among Native American children, but it rises from age 5 to 8 among the U.S. school children. Males were found to have slightly higher disease rates than females in both surveys (not shown).

Chart 3.2 Comparison of Dental Caries Rates in Primary Teeth of U.S. School Children and Native American Children

(Average df surfaces at ages 5-9 years from the 1987 NIDR Survey and the 1991 IHS Patient Survey)

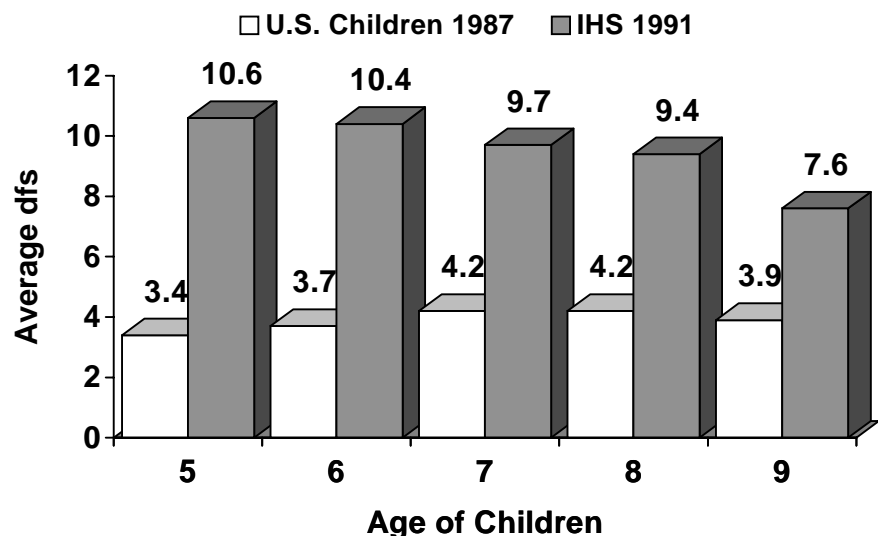


Chart 3.3 Dental Caries in the Primary Teeth of Native American Children Aged 5-9 by Area Program in 1991

(Average Decayed and Filled Tooth Surfaces)

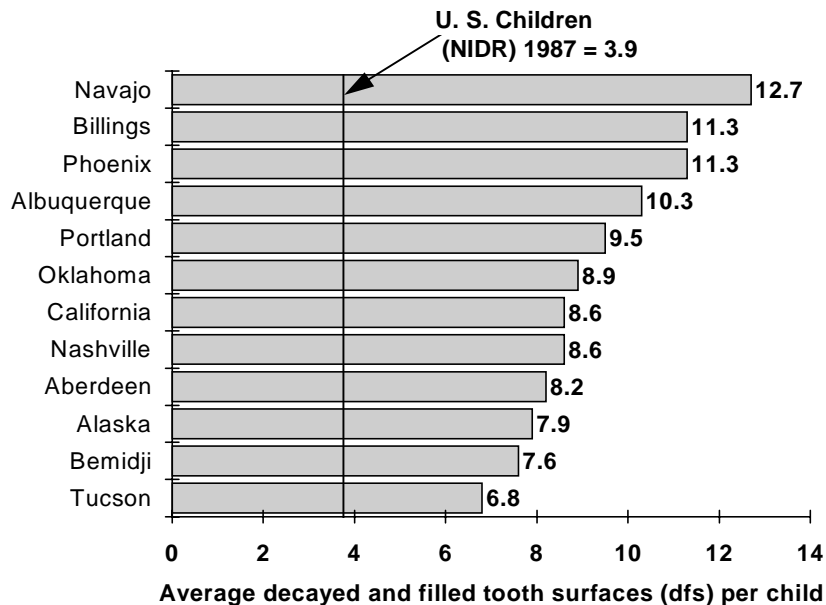


Chart 3.3 shows that, among the Areas in 1991, the dental caries rates in primary teeth ranged from a high of 12.7 dfs on the Navajo Reservation to a low of 6.8 dfs in the Tucson Area program. All Areas reported a rate much higher than the 3.9 dfs per U.S. school child in 1987 (NIDR). The intensive early treatment of decay (e.g., steel crowns) received by some young Native American children may account for part of the higher dfs rates.

The relatively low caries rate among the small Pima/Papago Indian population (Tucson), may reflect the benefit of broad, long-term access to fluoridated water, as discussed in Part 2.

Chart 3.4 compares the proportion of patients aged 0-4 years who had 7-10 or 11+ dmft teeth in each Area program in 1991. Though small sample sizes and selection bias in this age group limit the value of this analysis, the differences among the Area programs cannot be ignored.

The rapidly-growing Navajo population has reported the highest proportion of children with 7-10 and 11+ dmft in the IHS monitoring system for many years. The rates in other Areas have been more variable. The proportion of 0-4 year-olds with 11+ dmft teeth might be viewed as a crude estimate of the proportion of patients having BBTD (rampant caries) in each Area program.

Chart 3.4 Proportion of Native American Children Having "High" Tooth Decay Rates in Primary Teeth by Area Program

(Percent of Children Aged 0-4 Having 7-10 or 11+ dmft Primary Teeth in the 1991 IHS Patient Survey)

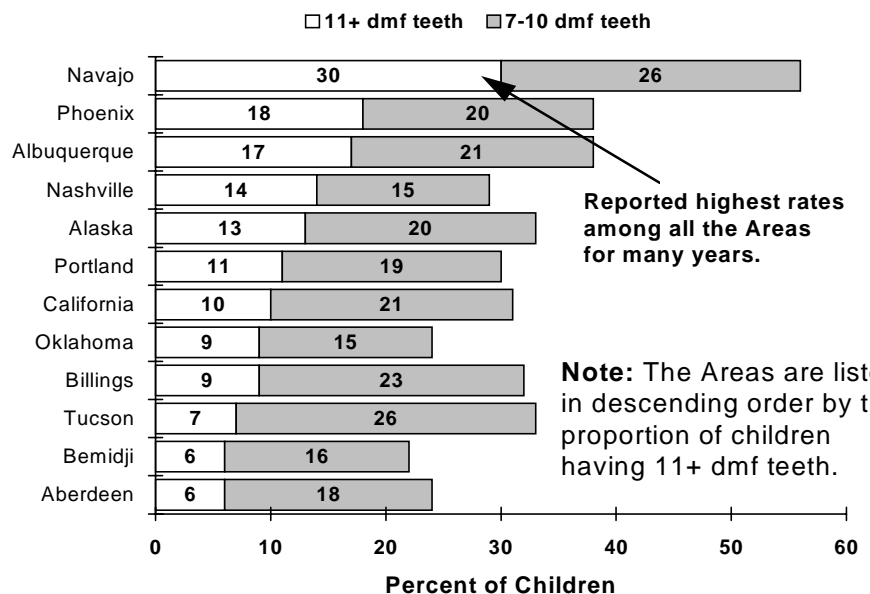
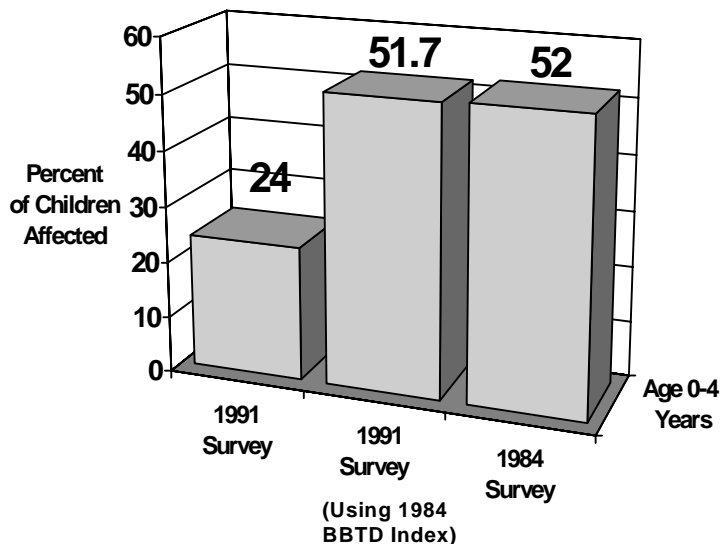


Chart 3.5 Estimates of Baby Bottle Tooth Decay (BBTD) Rates Among Preschool Age Native American Children in 1984 and 1991

(Percent of Patients Aged 0-4 Years Having BBTD Based on Two Different Decay Pattern Indices)



1991 BBTD index = 2+ upper incisors had with smooth surface decay

1984 BBTD index = 2+ upper incisors had any decay

Using a relatively crude method, the 1984 IHS Patient Survey data were used to estimate that about 52 percent of the preschool-aged children experienced BBTD. Other surveys, not limited to dental patients, reported BBTD rates ranging from 20 to 50 percent.

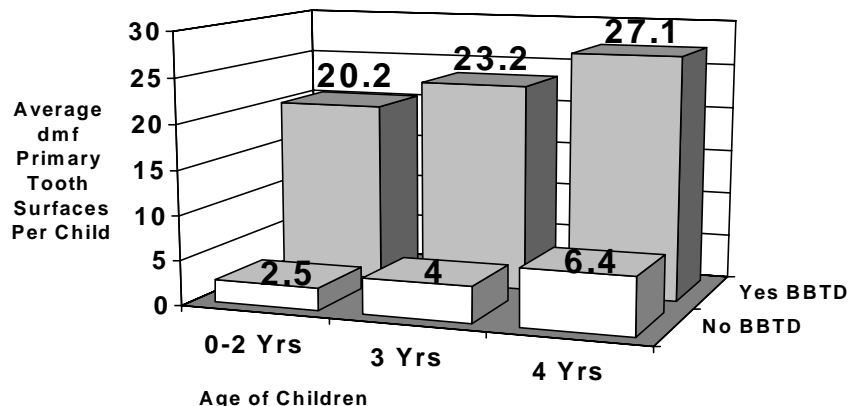
A more refined BBTD index (using specific tooth surfaces) was applied to the 1991 survey data. That index indicated 24 percent of the patients aged 0-4 had BBTD. When the old 1984 BBTD index was applied to the 1991 data, the BBTD rate rose to 51.7 percent, matching the 1984 estimate. Because children having BBTD are more likely to seek treatment than children with little decay, it may be difficult to detect trends in BBTD among patients for many years to come.

The BBTD rates derived from dental patients may overestimate the rate of disease in Native American communities, but the high rates of BBTD shown above do not over-state the impact of this health problem on the dental care delivery system.

Chart 3.6 reveals that 4-year-old patients with BBTD averaged more than four times as many dmfs as those without the condition (27.4 vs 6.4). Even before age 3, children with BBTD averaged over 20 dmfs. This burden of disease places heavy pressure on the resources available to provide dental care for all patients.

Chart 3.6 Severity of Tooth Decay Among Native American Children Having or Not Having Baby Bottle Tooth Decay (BBTD)

(Average dmfs Primary Tooth Surfaces Among Children Aged 0-4 Years in the 1991 IHS Patient Survey)



(BBTD = Two or more upper incisors having smooth surface cavities)

PART 4. PERIODONTAL (GUM) DISEASES

Periodontal or "gum" diseases are a major reason for tooth loss among adults. These diseases are generally classified as forms of **gingivitis** or **periodontitis**. Gingivitis is a common condition limited to the cuff of tissue surrounding teeth. It is characterized by gums which bleed easily, particularly during tooth brushing. Periodontitis is a more serious problem involving destruction of the supporting bone which keeps teeth attached firmly to the jaw. Unfortunately, periodontitis alone does not often cause bleeding or pain until the destruction is quite advanced.

The common forms of these diseases are associated with poor oral hygiene, which results in the accumulation of soft (plaque) and hard (tartar) debris around teeth. If not controlled, common gingivitis (incipient disease) can lead to periodontitis (overt disease), but the natural progression of these conditions is not well understood. Disease activity can fluctuate over a period of years and certain health problems, particularly diabetes mellitus, can accelerate destruction of the gum tissues. Common gingivitis can be reversed by effective cleaning of the teeth, but periodontitis may require more extensive therapy.

Various surveys have indicated that the rate of gingivitis has declined slightly among U.S. adults, while the proportion of adults with periodontitis has not. Only 15-20 percent of adults have been found to have advanced gum disease in the U.S. population and in most other industrialized countries.

Periodontal diseases can be difficult and time-consuming to assess. Thus, no universal method to survey these conditions has been established, like the DMF index is used for tooth decay. During the past 30 years, the IHS patient monitoring system has employed two different methods promoted by the World Health Organization (WHO).

Though different from the measurements used in U.S. National Surveys, the methods used by the IHS have been essential for estimating the amount of program resources needed to treat gum disease in Native American communities.

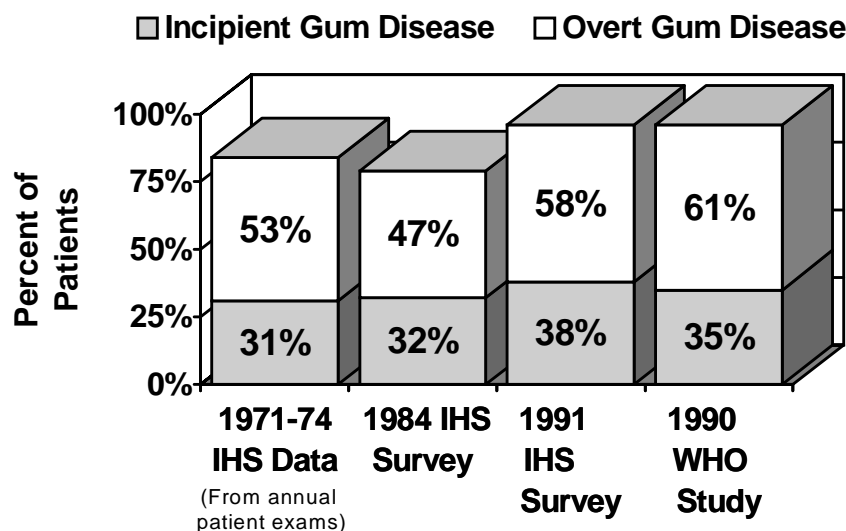
For more than a decade the **Community Periodontal Index of Treatment Needs (CPITN)** has been promoted by the WHO for use in oral health surveys throughout the world. The CPITN provides a quick and easy-to-learn method for assessing periodontal health and estimating the type and amount of treatment needed among patients. For these reasons the CPITN was used to examine Native Americans in the 1991 IHS Patient Survey and in the second WHO International Collaborative Study (ICS-II) conducted in 1990.

The CPITN is based upon assigning a score to each anatomic sextant of the mouth. Three scores are given to the upper jaw and three to the lower jaw. Each score represents the most severe condition found when the gums are examined around specific teeth, using a specially-designed probe. The clinical signs associated with each CPITN sextant score and the general therapy recommended for these conditions are as follows:

CPITN Score	Description of the Most Severe Condition	Therapy Recommended
0	No bleeding, healthy gums	Self-care only
1	Bleeding when examined	Oral hygiene education
2	Bleeding + tartar present	Same as above + cleaning at clinic
3	Shallow "pockets" (4-5mm) around one or more teeth	Same as above + pocket therapy
4	Deep "pockets" (6+ mm) around one or more teeth	Same as above + major therapy
X	Fewer than two teeth remain in the sextant	No therapy level is assigned

Chart 4.1 Trends in Periodontal Disease Among Native American Adults

(Percent of Dental Patients Aged 35-44 With Incipient or Overt Gum Disease in 1971-74, 1984, and 1991 From the IHS Oral Health Monitoring System)



For the analysis in Chart 4.1 results from the 1984 and the 1991 IHS patient surveys were adapted to correspond with the IHS monitoring data collected from 1971-74, which were averaged to compare the proportion of patients having incipient disease only (gingivitis) with those having any overt disease (periodontitis) involving bone loss and pocketing.

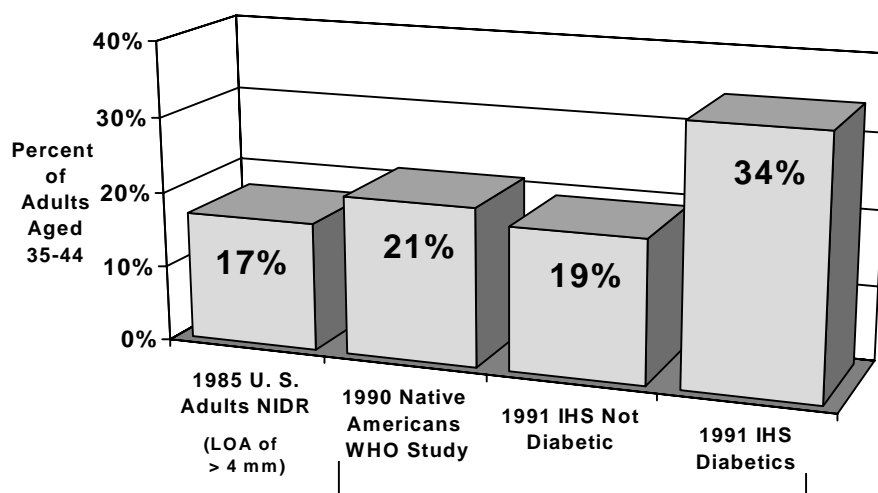
The proportion of adults having either condition was similar during all three time frames. The higher rate of gingivitis (38 %) and periodontitis (58 %) in 1991 may result from these adults having more teeth remaining than did the 35- to 44-year-olds in 1971-74 and 1984.

Due to differences in survey methods, the data used for U.S. employed adults (NIDR, 1985) on Chart 4.2 are based on the level of periodontal tissue loss of attachment (LOA), rather than on the "deep" pocket scores (CPITN = 4) reported for Native Americans in the 1990 WHO Study and the 1991 IHS Survey.

The proportion of 35-to-44-year-old U.S. employed adults with advanced disease (17 %) was lower than the WHO community-based sample of Native Americans (21 %) examined in 1990 and the non-diabetic patients examined (19 %) by the IHS in 1991. Almost twice as many diabetic patients had advanced disease (34 %) as the non-diabetic patients did in 1991.

Chart 4.2 Advanced Periodontal Disease Among U.S. Adults Versus Native Americans Examined In the 1990 WHO Study and the 1991 IHS Survey

(Percent of 35- to 44-year-olds Having Any Deep Pockets - a CPITN Score of 4 in Any Part of the Mouth)



Based upon any CPITN score of = 4

Chart 4.3 Comparison of Periodontal Disease Among Patients Versus the Community: Percent Healthy and Diseased Adults

(Proportion of Adults By Their Highest Level of Disease From the 1990 WHO Study and 1991 IHS Patient Survey)

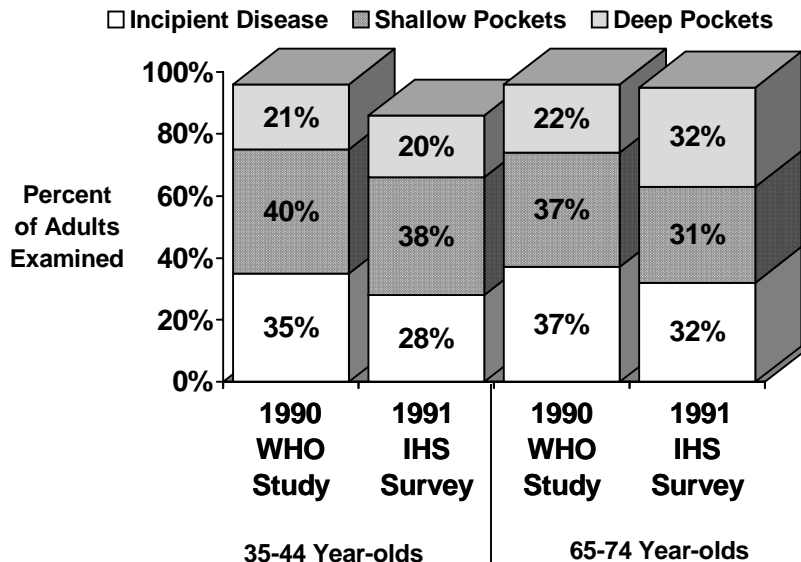


Chart 4.3 compares the percent distribution of adults by their highest level of disease severity in the mouth. Incipient disease = CPITN scores of 1 or 2 only, Shallow pockets = no CPITN score greater than 3 in any sextant, and Deep pockets = a score of 4 in one or more mouth sextants.

The proportions of 35- to 44-year-old dental patients examined in 1991 were similar in all three disease categories to the community-based sample of Native Americans (Sioux, Navajo) included in the 1990 WHO Study. Among the 65-74 year old seniors, a substantially higher proportion of dental patients had deep pocketing (32 %) than did the community-based sample (22 %).

Chart 4.4 compares the average number of mouth sextants that were either “healthy”, had periodontal pocketing, or which could not be scored due to tooth loss.

In both age groups of adults, the community-based sample of Native Americans in the WHO Study averaged more sextants with “No Remaining Teeth” than did the IHS patient sample. Among the 35- to 44-year-olds, the average number of sextants needing treatment due to pocketing were the same (1.7) for the IHS patients in 1991 and the community-based sample examined in the 1990 WHO Study.

Chart 4.4 Comparison of Periodontal Disease Among Patients Versus the Community: Healthy and Diseased Mouth Sextants

(Average Sextants by Disease Status Among the 35-44 and 65-74 Year-olds In the 1990 WHO Study and 1991 IHS Survey)

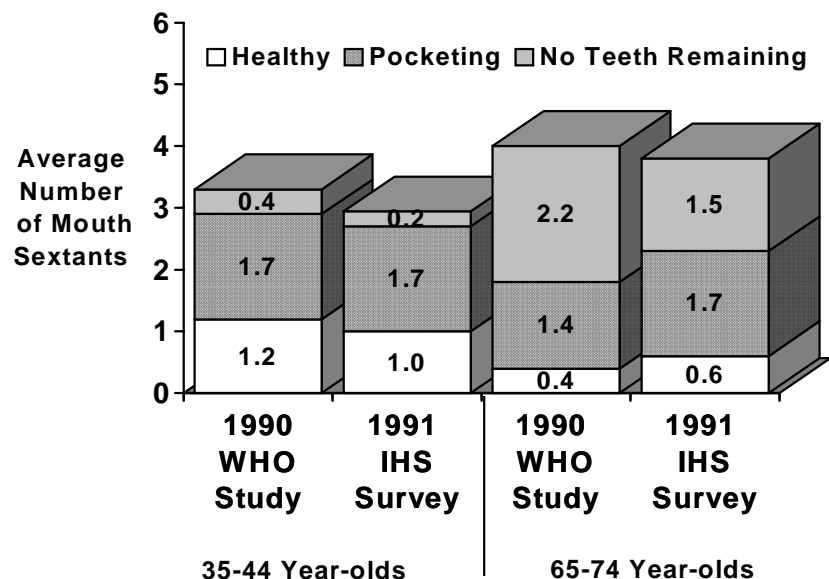
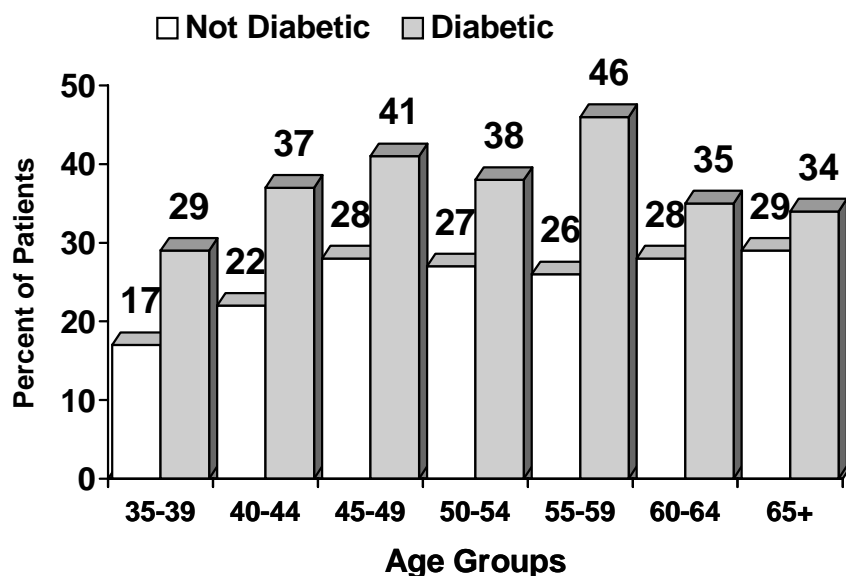


Chart 4.5 Proportion of Native American Adults Having Deep Pocketing by Age and Diabetic Status

(Percent of 35- to 44-year-olds in the 1991 IHS Patient Survey Having 6+mm Deep Pockets in Any Part of the Mouth)



The analysis on Chart 4.5 is limited to adults aged 35 years and over who were classified as having or not having diabetes mellitus in the 1991 IHS Patient Survey. The proportion of patients with advanced disease, those having deep periodontal pocketing (CPITN = 4) in any sextant of the mouth, is substantially higher among diabetics in every age group.

The decrease in the proportion of patients with deep pocketing after age 60 reflects the effect of tooth loss due to disease (periodontitis and dental caries) among both the diabetics and non-diabetics.

Chart 4.6 shows the percent of adult males and females by age who were reported to have any "deep" periodontal pocketing (6mm or greater) when they were examined in the 1991 IHS Patient Survey.

In all age groups a higher proportion of males had periodontitis with deep pocketing than did the female patients. Above age 35, about 1/3 of the males were affected while less than 1/4 of the females (who are more likely to have diabetes) were affected.

Surveys of other populations have shown that males are at greater risk of periodontitis, even in developing countries where oral hygiene is generally poor among both sexes.

Chart 4.6 Proportion of Native American Adults Having Deep Pocketing by Age and Gender

(Percent of Adults in the 1991 IHS Patient Survey with a CPITN Score of 4 in Any Sextant of the Mouth)

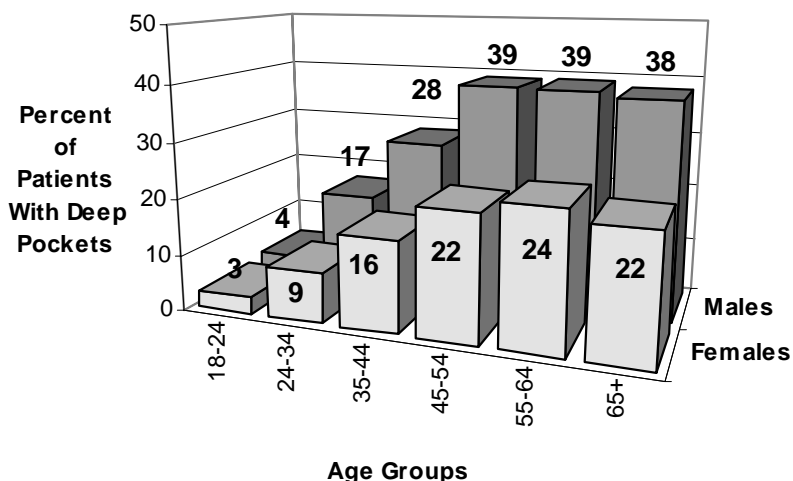


Chart 4.7 Proportion of Native American Adults Having Shallow or Deep Periodontal Pocketing by Area Program in 1991

(Age-adjusted Percent of Dentate Patients Aged 35+ Years By Their Highest CPITN Scores: 3 = Shallow and 4 = Deep Pockets)

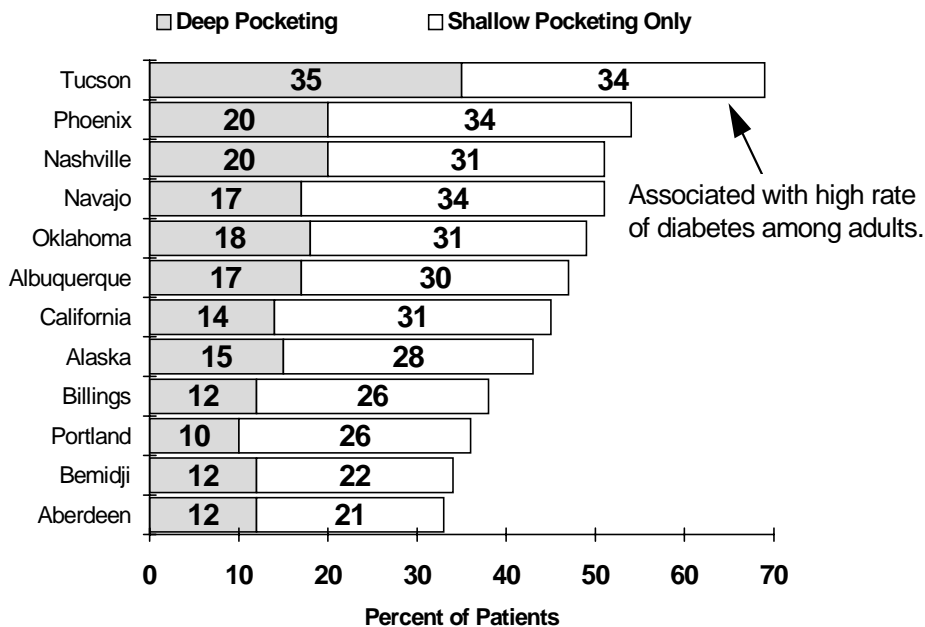


Chart 4.7 lists the Area programs in descending order by the proportion of adults age 35 and over who had only shallow pockets (CPITN = 3) and those who had any deep pockets (CPITN = 4). Except for the Tucson program (35%), where diabetes is common, the proportion of patients with deep pocketing does not exceed 20 percent in any Area.

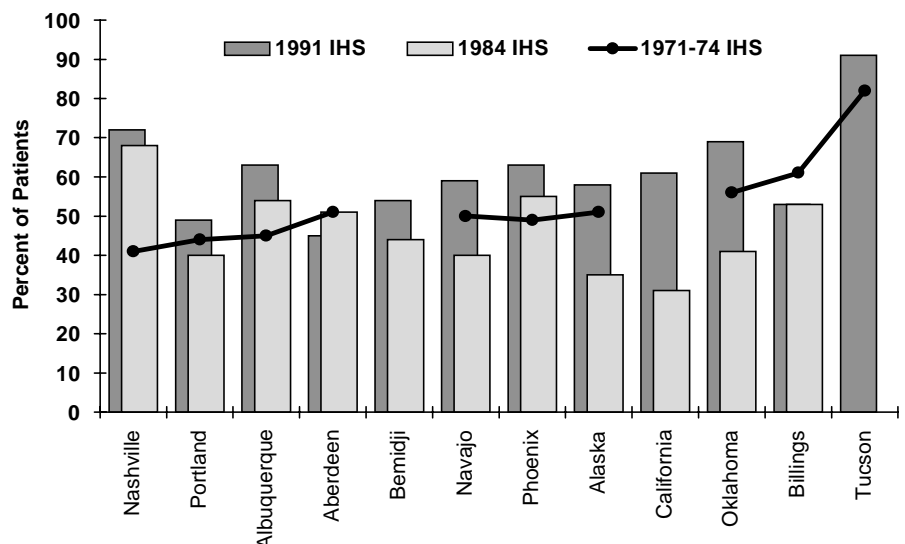
However, the combined proportion of adults having either form of pocketing exceeded 30 percent in all Areas and 40 percent in 8 of the 12 regional programs. This implies that at least 3 to 4 of every 10 adult patients need professional treatment to improve these conditions and prevent eventual tooth loss.

Chart 4.8 compares the patient monitoring data collected by the IHS from 1971-74 with findings from the 1984 and 1991 IHS patient surveys. The Area programs are listed in ascending order by the percent of 35- to 44-year-olds having any periodontitis during 1971-74 (if data were available).

Patients in the Tucson program had the highest rates of periodontitis in 1971-74 and 1991. No other trends are evident, except that the rate of disease in most Areas was the highest in 1991. The increase in disease rates is not surprising since patients had more teeth at risk in 1991 than in previous years.

Chart 4.8 Historical Comparison of Periodontal Disease Among Native American Adults by Area Program: 1971-74, 1984, and 1991

(Percent of 35-44 Year Old Patients Having Any Periodontal Pocketing Based On the IHS Monitoring System Data)



PART 5. EDENTULISM AND TOOTH LOSS

The loss of all natural teeth (edentulism) is a socially and physically handicapping condition. Unfortunately, the replacement of missing teeth with dentures or "false teeth" is not as effective as the treatment which can be offered when some or all natural teeth remain in the mouth. Thus, edentulism is viewed by dentists as the worst consequence of tooth decay and gum disease.

There are two ways to measure edentulism: **complete edentulism** describes persons with no teeth remaining in both the upper and lower jaws, and **partial edentulism** describes when one jaw has no teeth, while the other jaw has at least one tooth remaining. Neither form of edentulism is common before age 35 among Native Americans.

The 1985 NIDR Survey of U.S. Adults indicated that edentulism decreased among U.S. seniors during the past 30 years. Though edentulism among Native Americans was not monitored by

the IHS prior to the 1984 Patient Survey, it is possible to assess long-term trends in tooth loss. These data may also reflect trends in complete edentulism.

It is known, however, that edentulous persons are not as likely to visit a dentist as those who have natural teeth remaining. Thus, the edentulism data from dental patient surveys usually underestimate the amount of edentulism in a population. Results from the community-based sample of Sioux and Navajo Indian adults examined in the 1990 WHO Study provide a more complete picture of edentulism among Native Americans. These data, like the IHS patient data, suggest there are large differences in edentulism rates among the Areas. The reasons for these regional differences remain unclear, but limited access to care for adults and older Native Americans is a large factor.

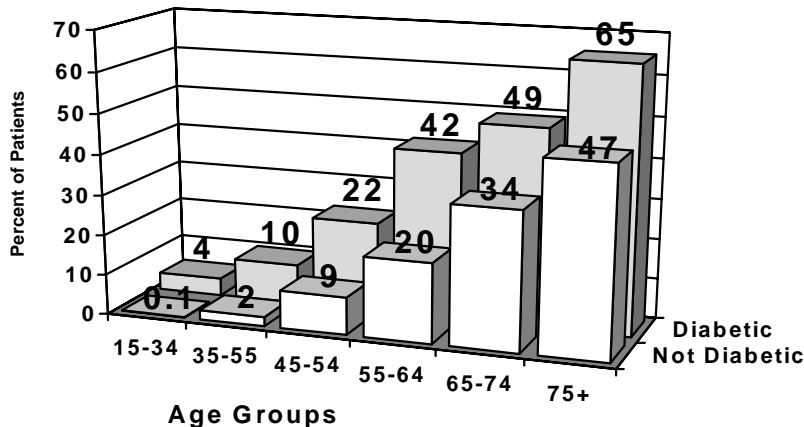
Table 5.1 suggests that the proportion of seniors who are edentulous is similar among the U.S. population (41 %), the Native Americans in the 1990 WHO Study (40 %) and those in the 1991 IHS Patient Survey (42 %). Due to differences in survey methods, however, these findings could be coincidental. Edentulism among diabetic seniors (53 %) was substantially higher than among non-diabetics (38 %) in the 1991 patient survey. The 1990 WHO Study revealed that over half (53 %) of the seniors in the Aberdeen program (Sioux) were edentulous compared to only 30 percent in the Navajo Area.

**Table 5.1 Edentulism Among U.S. Seniors
Versus Native American Seniors**

(Percent of 65+ year-olds who were edentulous:
U.S. Seniors in 1985/NIDR, Native Americans in
1990/WHO Study, and dental patients in 1991/IHS)

<u>1985 NIDR Survey of U. S. Adults:</u>	<u>Edentulous</u>
Seniors Age 65+	41 %
<u>1990 WHO Study:</u>	
Native Americans Age 65 - 74	40 %
Aberdeen (Sioux)	53 %
Navajo	30 %
<u>1991 IHS Patient Survey:</u>	
All Patients Age 65+	42 %
Diabetic Patients	53 %
Non-diabetics Patients	38 %

Chart 5.2 Edentulism Among Native American Patients by Age and Diabetic Status in 1991
(Percent of Patients Who Had No Remaining Natural Teeth)



Note: It is difficult to monitor trends in complete edentulism among the dental patient population. As access to care for Native American seniors improves, the rate of edentulism may appear to increase in the future if more edentulous patients seek dental care (dentures) which has been largely unavailable to them for many years.

Chart 5.2. shows that the proportion of Native Americans who are completely edentulous steadily increases with age. Diabetic patients experience a higher rate of edentulism in each age group.

Among the 55- to 64-year-olds, edentulism among diabetics (42 %) was double that of non-diabetics. Some 65 percent of the diabetic patients age 75 and over were edentulous in 1991.

Since diabetes decreases life expectancy, it is likely the sample of diabetic seniors fails to represent the full extent of edentulism related to this disease. Elderly diabetics form a relatively small group of survivors of this disease, which is increasing in many Native American communities.

Chart 5.3 reveals that the community-based samples of Sioux and Navajo Indians examined in the 1990 WHO Study produced edentulism rates similar to those found among dental patients by the IHS in 1991. The Sioux Indians (Aberdeen) were consistently found to have a much higher rate of edentulism than the Navajo Indian adults in both surveys.

When compared with the other Area programs, the Aberdeen Area reported the highest rate of edentulism, while the Navajo Area reported the lowest rate among adults (see Chart 5.6).

Chart 5.3 Comparison of Edentulism Among Dental Patients Versus the Community
(Percent of the 35- to 44 and 65- to 74-year-old Native Americans Who Were Edentulous in the 1990 WHO Study Sample and in the 1991 IHS Patient Survey in the Aberdeen and Navajo Areas)

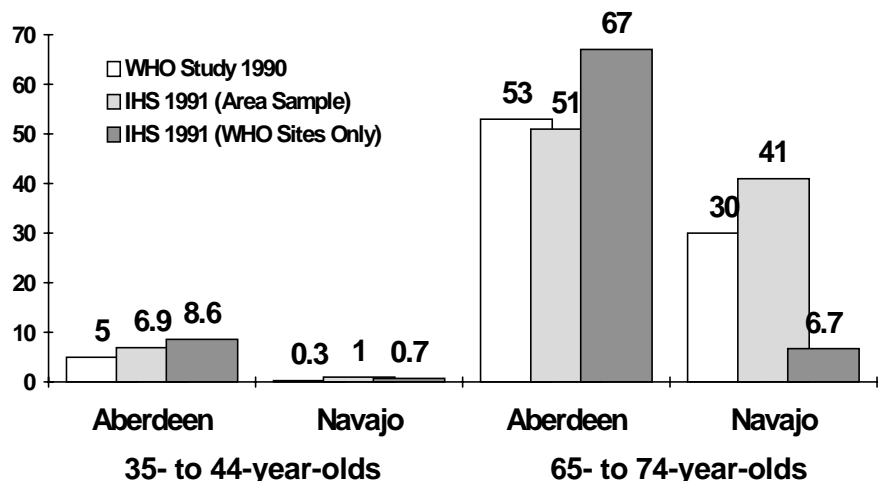


Chart 5.4 Proportion of Native American Patients Who Were Either Edentulous or Had 20 or More Remaining Teeth by Age

(Percent of Dental Patients Surveyed in 1991 by Age Group)

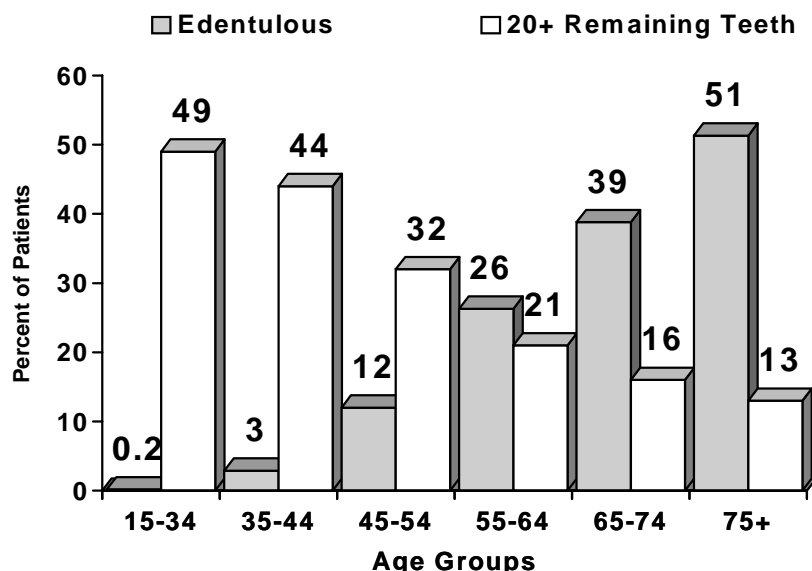


Chart 5.4 provides an analysis of edentulism and remaining teeth among Native American patients by age. Ideally, adults will retain all 28 of their permanent teeth throughout life, excluding their 3rd molars (called the "wisdom teeth").

Findings from the 1991 IHS Survey show that, as the proportion of edentulous patients increases with age, the proportion of patients with 20 or more remaining teeth steadily declines. Among young adults, aged 15-34, only 49 percent had 20 or more teeth remaining. By age 65-74 years, almost two out of five Native American patients (39 %) were edentulous; and, fewer than one in five patients (16 %) had 20 or more teeth remaining in 1991.

When compared with findings from the 1984 IHS Patient Survey on Chart 5.5, a larger proportion of patients examined in 1991 had 20 or more teeth remaining in all age groups. Patients aged 55+ years are grouped together due to the very small sample of Native American seniors obtained in the 1984 survey.

The substantial improvement after age 35 may result principally from better access to care for adults than in the past. Dentists are able to provide more extensive treatment to "save" rather than to extract diseased teeth. Also, many Native American adults may be developing a stronger desire to keep their natural teeth as they grow older.

Chart 5.5 The Proportion of Patients Who Had 20 or More Teeth Remaining by Age in the 1984 and 1991 IHS Surveys

(Percent of Dental Patients by Age Group)

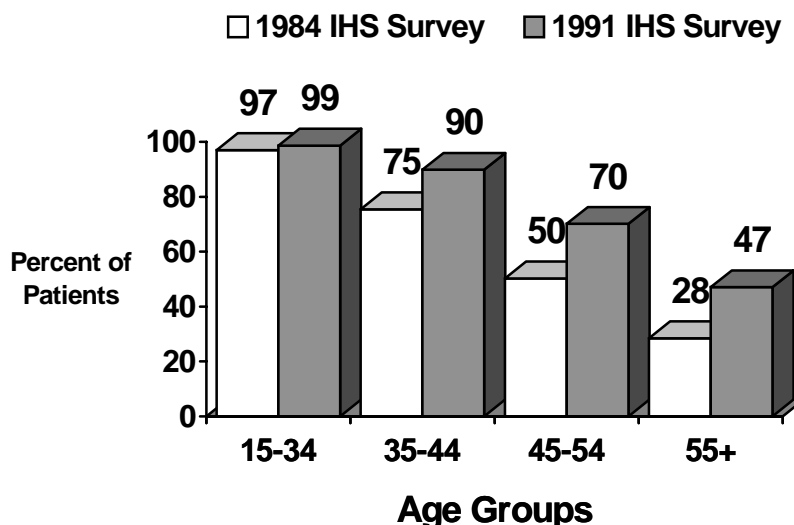


Chart 5.6 Complete and Partial Edentulism Among Patients by Area Program in 1991

(Age-adjusted Rate Among Patients 20+ Years of Age With No Teeth Remaining in One or Both Jaws)

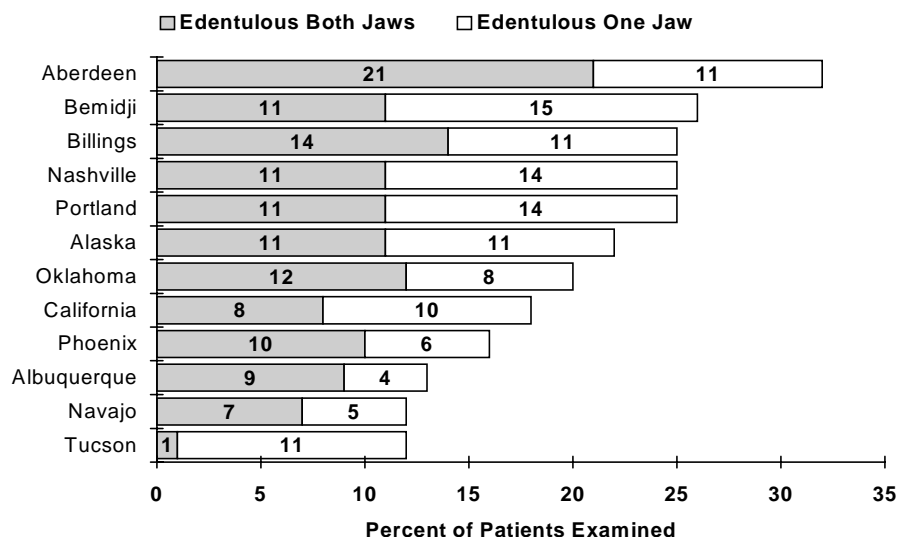


Chart 5.6 compares findings from patients age 20 and over which have been age-adjusted to the IHS Service Population. The Areas are listed in descending order by the total proportion of patients with either condition.

Programs of the Southwest region generally reported the lowest rates of complete and partial edentulism. Aberdeen reported the highest rate of complete edentulism (21%). The very low rate of edentulism among patients in the Tucson Area (1 %) may be affected by its relatively small sample of older adults.

Chart 5.7 compares tooth loss among the Area programs based upon the average number of remaining teeth among patients age 45 and over. Edentulous patients are excluded from this analysis.

Native American patients in the Southwest region, excluding Tucson, had the highest number of remaining teeth. These Areas also have reported the lowest tooth decay rates in permanent teeth for many years (see Part 2). The findings suggest that tooth loss has been lowest where decay rates in the permanent teeth have been the lowest. Thus, high decay rates and limited access to care may result in substantial tooth loss in a population at relatively early ages.

Chart 5.7 Average Remaining Teeth Among Adult Patients Aged 45+ Years by Area Program

(Age-adjusted Average Teeth Remaining, If Any Teeth Remained)

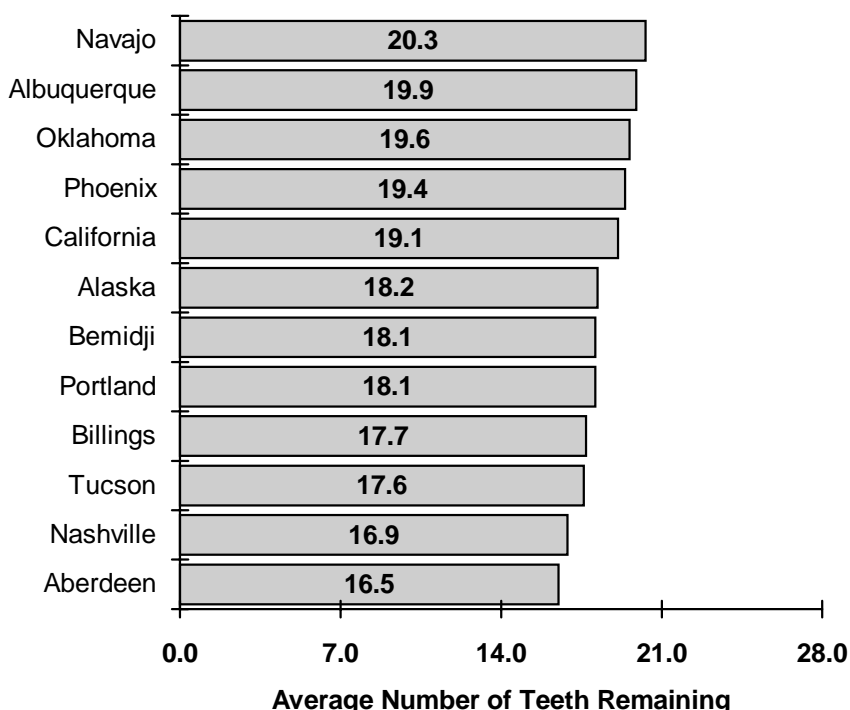
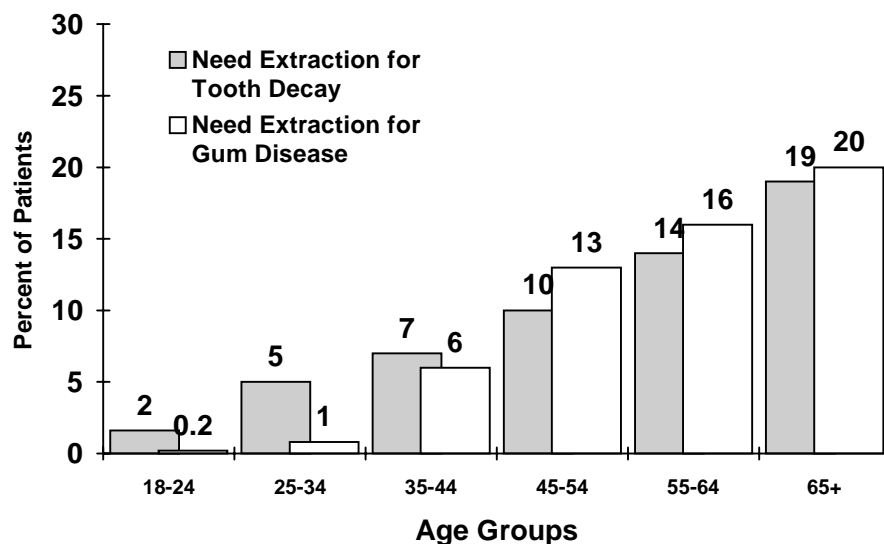


Chart 5.8 Proportion of Adults by Age Who Needed Any Teeth Extracted Due to Tooth Decay and/or Periodontal Disease in 1991
(Percent of Dental Patients Examined)



The reason that teeth are missing among adults can be difficult to determine in a survey. Therefore, Chart 5.8 is based upon the need for tooth extractions among dental patients due to severe decay or gum disease.

The proportion of patients needing one or more tooth extractions due to either disease steadily increases with age. After age 35 the proportion of patients needing extractions due to decay or periodontal disease is similar in each age group. These findings reflect many years of high disease rates and limited access to dental care for Native American adults.

Though the proportions of adult Native Americans needing any teeth extracted for decay or gum disease are similar (as shown above), Chart 5.9 reveals that the average number of teeth needing extraction due to periodontal disease was greater than the extractions needed for decay in every age group in 1991.

The average number of tooth extractions needed for decay remains relatively constant at all ages. However, the small proportion of adults under age 35 who needed extractions due to gum disease (see Chart 5.8) averaged the highest number of teeth needing extraction when compared with older age groups on Chart 5.9.

Chart 5.9 Number of Tooth Extractions Needed Among Adults Due to Tooth Decay and Gum Disease by Age in 1991
(Average Number of Tooth Extractions Needed Among Patients Who Needed Any Extractions)

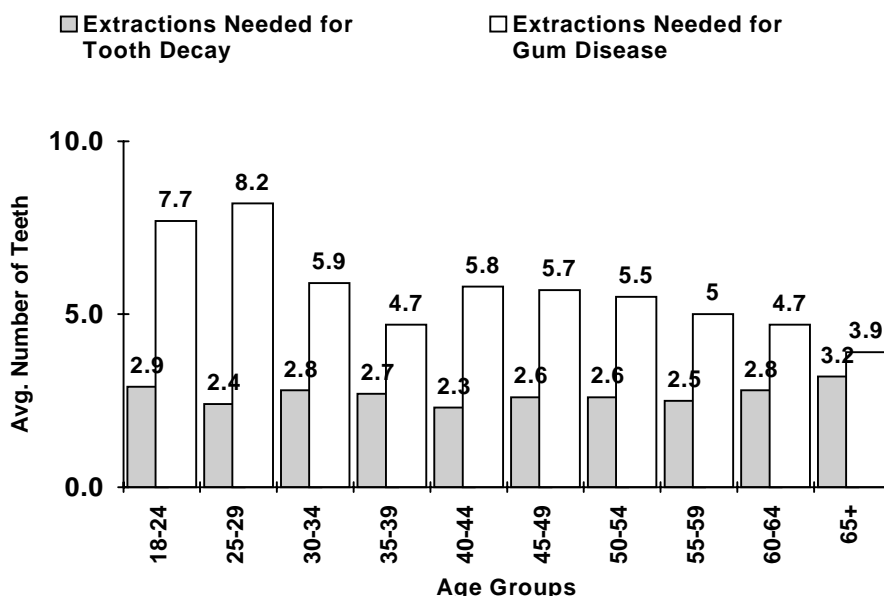
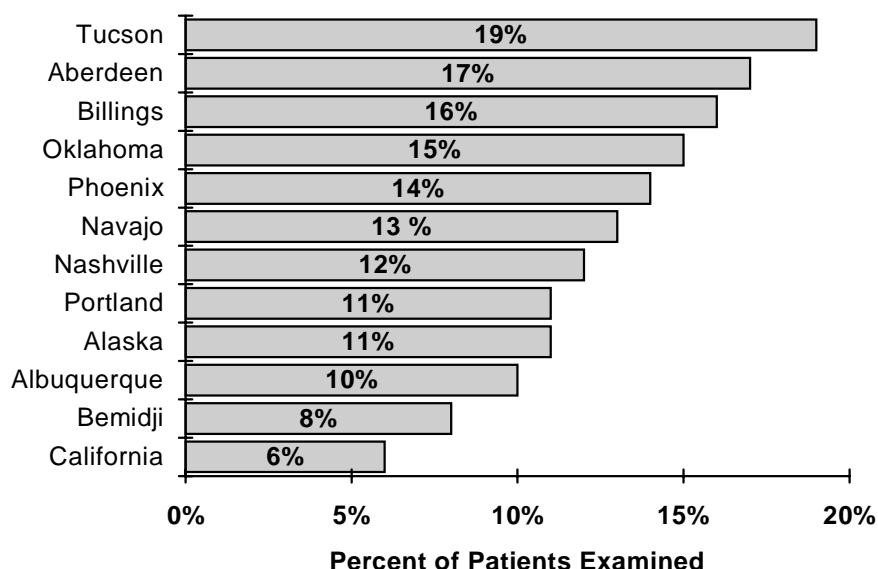


Chart 5.10 Proportion of Adults Needing Teeth Extracted Due to Tooth Decay or Gum Disease by Area Program in 1991

(Age-adjusted Percent of Patients Age 20+ Years)



The differences in the need for tooth extractions reported among the Area programs on Chart 5.10 probably reflect regional differences in disease rates as well as variations in how well each Area is able to provide adequate access to basic and rehabilitative dental care for Native American adults.

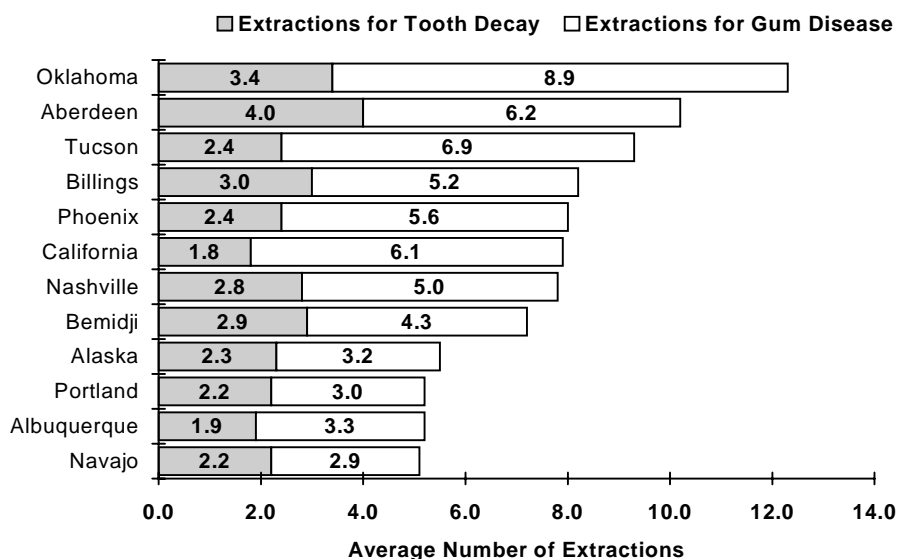
The proportion of adults age 20 and over needing extraction(s) due to decay and/or gum disease in 1991 varied from a high of 19 percent in the Tucson program to a low of 6 percent in California.

The age-adjusted average rate of tooth extractions needed among adult patients who needed any extractions for decay or gum disease in 1991 provides a picture of what could be future trends in tooth loss among the Areas.

The Oklahoma Area's very high rate of teeth needing extraction for gum disease (8.9) and decay (3.4) may be an overestimate of the problem due to the effect of age-adjustments on a relatively small sample of older adults in that Area. The lower rate of need for extractions in the Navajo and Albuquerque Area programs parallels the relatively low tooth decay rates reported in the Southwest region.

Chart 5.11 Average Number of Tooth Extractions Needed For Tooth Decay and Gum Disease Among Adults by Area Program in 1991

(Age-adjusted Rates Among Native American Patients Age 20+ Years Who Needed Any Extractions)



The Oral Health of Native Americans - An Indian Health Service 1991 Survey

PART 6. OTHER ORAL CONDITIONS

Tooth decay and gum disease remain the most common and most important dental health problems which need to be monitored in Native American communities. However, certain other oral conditions also need to be assessed periodically to estimate their impact on public health and the extent of health care resources needed to reduce these problems. This section presents only a brief summary of important findings regarding some of the conditions included in the IHS Oral Health Monitoring System for the first time during the 1991 IHS Patient Survey. These conditions are:

1) present use of tobacco, 2) serious trauma to permanent teeth, and 3) the proportion of children who receive orthodontic care.

It is known that the health condition and behavior of patients may not accurately represent persons who receive no dental care. However, health trends observed among patients over a period of years usually reflect similar trends in the community at large. The findings derived from dental patients, which are discussed on the following pages, provide important public health information that should be available in any modern dental care program serving Native Americans.

Since no data were available from prior patient surveys and no one method has been used consistently to measure these conditions in national surveys, the IHS developed new ways to collect data for the 1991 IHS Patient Survey. When possible, the methods used in other population surveys were adapted for efficient and reliable use by dentists. The goal was to provide a simple way for any local program serving Native Americans to monitor trends in these conditions among their patients. The methods devised by the IHS to measure some conditions are discussed briefly in the following paragraphs:

Use of Tobacco: Each patient over age 5 was asked if he or she uses any form of tobacco routinely. Other evidence of current (but not past) tobacco use could be obtained from the patient's health history questionnaire and from examining the mouth. If any doubt about tobacco use remained after the assessment, the patient's survey record was marked as "undetermined". Since only the present and routine use of tobacco was assessed, the findings exclude patients who use tobacco infrequently and those who have stopped using it altogether. It is known that patients may under-report harmful behaviors such as tobacco use. Frequent cigarette use leaves signs in the mouth which dentists easily detect; however, signs of habitual snuff or chewing tobacco use can be difficult to detect unless the behavior is long-standing. Thus, the use of smokeless tobacco is likely to be underestimated in the IHS patient surveys, particularly among children.

Trauma to Teeth: Injury to any of the six upper or six lower front teeth was recorded on patients from aged 6 to 40 years by using a system recently developed by the National Center for Health Statistics. Patient surveys may underestimate the rate of oral trauma in a community because individuals often do not seek treatment for minor or serious tooth injuries, particularly in rural Areas.

Children Receiving Orthodontic Care: Patients aged 6 to 40 were examined and queried to determine if they had received or were currently receiving orthodontic therapy to prevent or correct malpositions of the teeth and jaws. The status of treatment is easy for dentists to assess accurately in patient surveys. However, the rate of orthodontic therapy reported among dental patients usually provides an overestimate of the actual rate of therapy received in a community, particularly when access to this special type of care is very limited.

Chart 6.1 Proportion of Patients Using Tobacco Reported in 1991 by Age

(Percent of Dental Patients Using Smoking and/or Smokeless Tobacco)

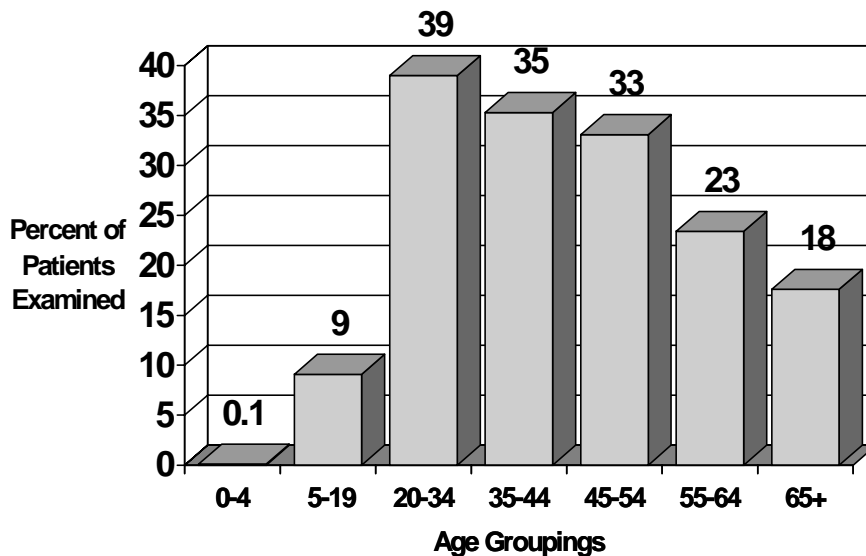


Chart 6.1 compares the percent of dental patients by age who were reported to be using tobacco during the 1991 IHS Patient Survey. Fewer than 1 of 10 children (9 %) aged 5-19 years used tobacco. However, 1 of 3 adult patients aged, 20 to 54 years (33-39 %) were using tobacco in 1991. Only 1 of 5 older adults, aged 55+ years, were reported to be using tobacco.

These findings indicate that a large and perhaps growing number of Native Americans, particularly young adults, use tobacco. Thus, it is increasingly important for dental care providers to play a role in reducing tobacco use among their patients.

Chart 6.2 shows the variation in tobacco use by age among the Area programs in 1991. Programs in the Southwest region (Tucson, Navajo, Phoenix, and Albuquerque) reported the lowest use of tobacco in most age groups, averaging less than 30 percent of the adults under age 55. In contrast, the Aberdeen, Alaska, Billings, Bemidji, and Nashville programs generally reported that 50 percent or more of the dental patients aged 20 to 54 years were using tobacco.

These findings reflect regional differences similar to those reported in more in-depth surveys of tobacco use among Native Americans. Further monitoring is needed in all communities to detect trends related to this major health risk factor.

Chart 6.2 Tobacco Use Among Dental Patients by Age and Area Program in 1991

(Percent of Patients Using Smoking or Smokeless Tobacco)

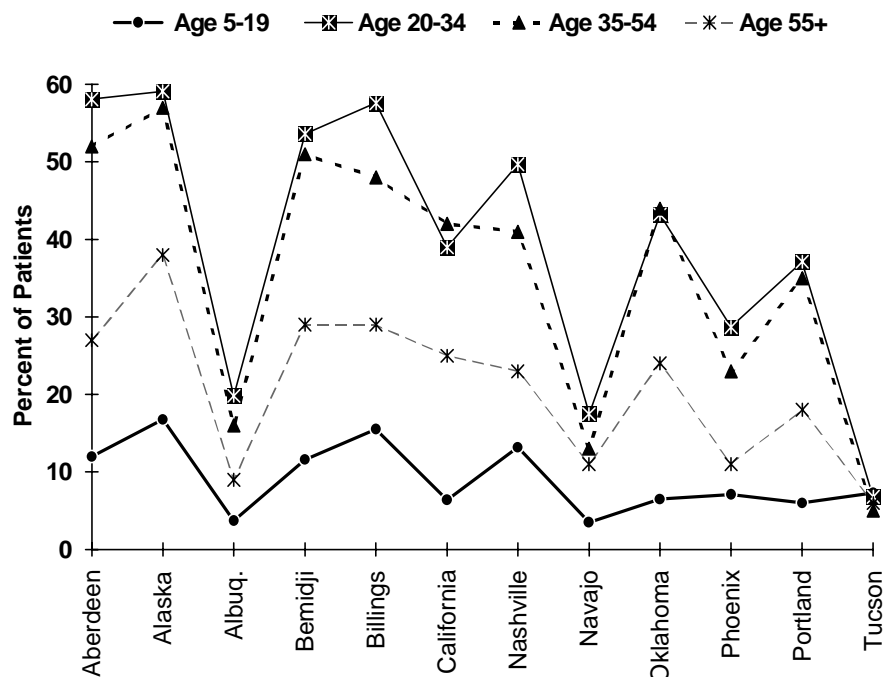
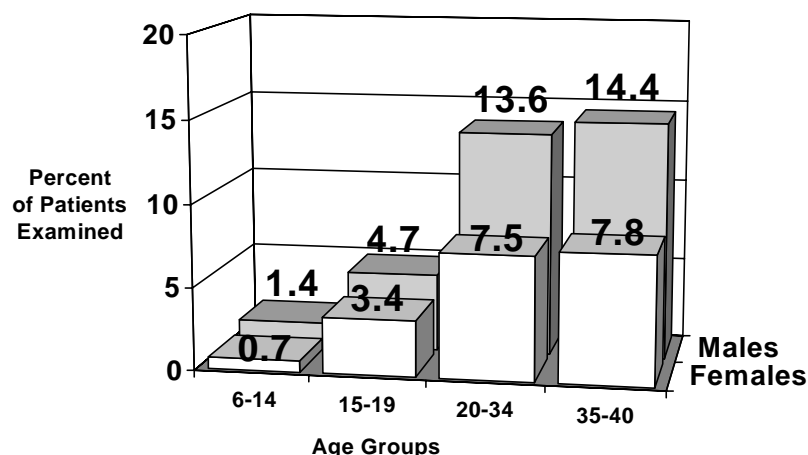


Chart 6.3 Trauma to Permanent Teeth of Native Americans by Age and Gender in 1991

(Percent of Patients Having at Least One Permanent Incisor Devitalized or Lost Due to Injury)



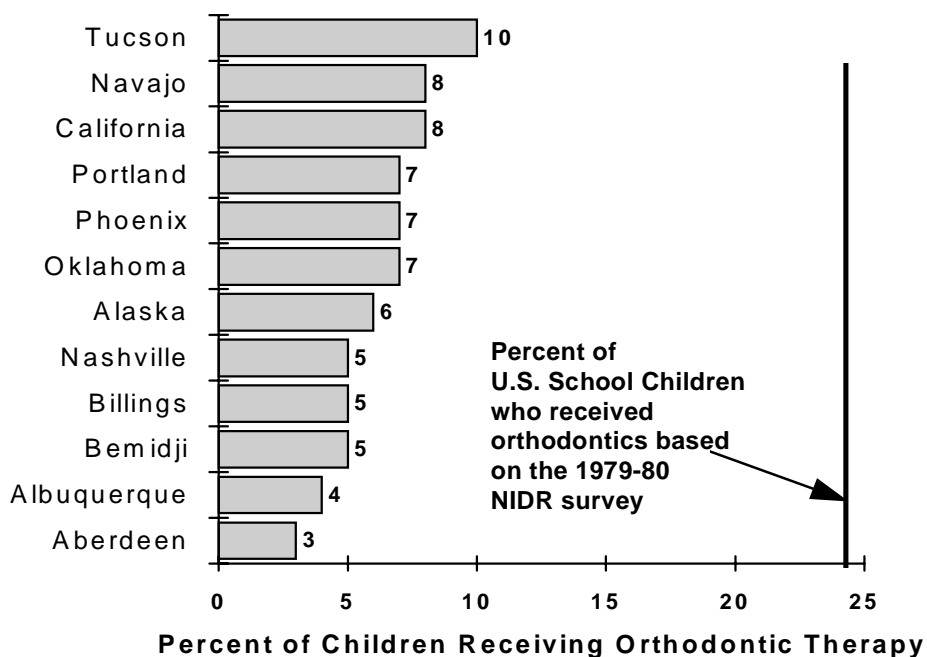
The analysis in Chart 6.3 includes only dental patients with "serious" trauma to the permanent front teeth (incisors) in 1991. Serious injury means that one or more teeth were knocked out of the mouth or broken badly enough to "kill" (devitalize) the nerve of a tooth. These data exclude a much larger number of Native Americans who suffer less serious trauma, which may also require treatment. At each age, a greater proportion of males than females had serious trauma. The rate of injury rises sharply among young adults and remains stable above age 20.

Orthodontic therapy involves the straightening of crowded teeth or malpositioned jaws. Chart 6.4 lists the proportion of Native American children aged 5-19 in each Area program who had received some form of orthodontic care by the time they were examined in the 1991 IHS Patient Survey. Also shown is a line depicting the proportion of 5- to 17-year-old U.S. children reported to have received orthodontic care as of 1980 (NIDR).

Native American children are known to need orthodontic care at a rate equal to or greater than other U.S. children. However, the proportion of children receiving this treatment in all Area programs as of 1991 (3-10%) was substantially lower than the proportion of U.S. children (24 %) who had received care over a decade ago.

Chart 6.4 Proportion of Native American Patients Who Receive Orthodontic Therapy by Area Program Compared to U.S. Children

(Percent of 5-19 Year-olds Examined in the 1991 IHS Survey Who Were In Therapy or Had Orthodontic Care Completed)



PART 7. DENTAL TREATMENT NEEDS

An essential component of the IHS Oral Health Monitoring System is the determination of **dental treatment needs** for each patient. These data are used to estimate the total amount of resources, including the number of dentists and size of clinics, which are needed to serve the Native American population in each of the twelve regional programs. The need for all types of dental care is statistically analyzed in relation to each Area program's user population and the **average treatment time requirement per patient** is determined. Thus, resource requirements for dental care are based on the average amount of clinical time, in minutes or hours per patient, which is needed by dentists and their assistants to provide the various types of treatment needed by the population they serve.

Each year the IHS uses these resource requirement data to formulate and justify the dental program budget request submitted to the Congress. The dental treatment needs data also are used to plan new clinic facilities and to formulate the allocation of available resources among the Area programs on an equitable basis each year.

The dental treatment needs of patients can reflect both the level of disease and the level of access to care in a population. High levels of tooth decay or gum disease in a community result in greater treatment needs among patients. The level of dental treatment needs among patients may also be great when adequate access to clinical care is unavailable over a period of years. Such is the case in many Native American communities, which are not able to control high dental disease rates or to treat the needs of all persons who seek care at IHS, tribal, and urban Indian clinics.

Given these factors, it is not surprising that the dental treatment needs of Native Americans have remained high since the IHS began monitoring

many years ago. Annual increases in the IHS dental program budget have not kept pace with rapid population growth in most Area programs. As access to dental care has improved in many communities in recent years, the average treatment time requirements of adults continue to reveal a large backlog of "**unmet needs**" representing many years in which all needed care was not provided.

Treatment needs data can be organized in many ways to make comparisons among the Area programs. It is useful to separate **basic dental care** needs from more complex **rehabilitative dental care** needs. All patients have some basic care needs, including regular "checkups", other preventive care and simple fillings when needed. These recurring needs consume a large portion of the resources available to all local dental programs each year. Some patients also need more costly rehabilitative care, which may include bridgework, dentures, surgery, orthodontics and other therapies to restore oral health. These treatment services often must be provided by dental specialists.

It is impossible to compare the treatment needs of Native Americans with other populations because needs are seldom assessed in large surveys. Data collection is difficult outside the clinic setting, and little agreement exists on how to determine the need for certain types of care. Since these data are important for managing program resources, the IHS devised methods to collect and analyze dental needs data among patients which would be reliable for making general comparisons among the Area programs. These methods were applied during the 1991 IHS Patient Survey process to minimize differences in the ways dentist examiners formulate treatment needs for various oral conditions.

Chart 7.1 Average Time Requirements for All Dental Treatment Needs by Area Program
(Age-Adjusted Clinical Service Minutes Needed per Patient)

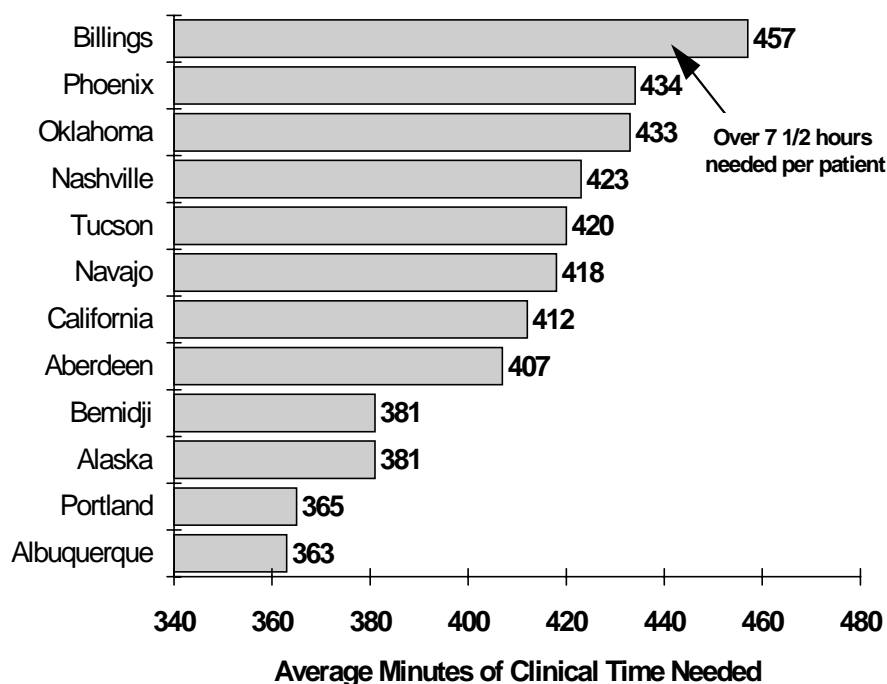


Chart 7.1 presents the age-adjusted per capita time requirements for all dental treatment needs combined from the 1991 IHS Patient Survey. The Billings Area reported a substantially higher rate of need per patient (457 min.) than all other Areas. Even the Area programs having the lowest rates averaged more than 6 hours of need per patient.

The differences between most Areas are not statistically significant, except at the high and low end of the range. However, differences between the population sizes of Areas are a major factor determining the amount of IHS resources distributed annually to each Area program based upon these needs data.

Chart 7.2 indicates that when the average per capita treatment time requirement (in hours) is separated into the basic and rehabilitative dental care needs, the rehabilitative treatment needs, including orthodontics, account for the principal differences between the rates of need among the Area programs.

Rehabilitative needs also comprise a large majority of the total treatment time requirement per patient in all Area programs. This finding may reflect the consequences of high dental disease rates and limited access to dental care among the Native American population.

Chart 7.2 Average Time Requirements for Basic and Rehabilitative Dental Treatment Needs by Area Program

(Age-Adjusted Per Patient Rate in Clinical Hours Needed)

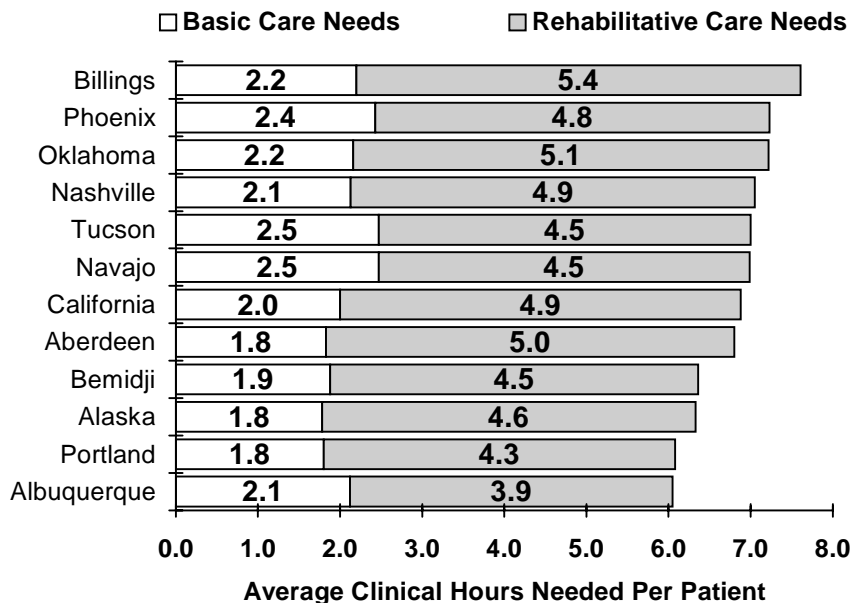
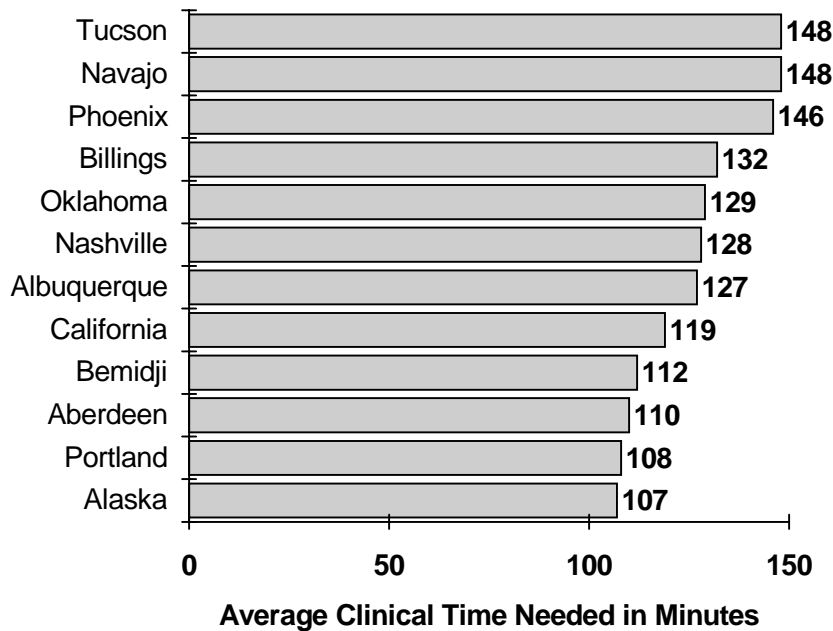


Chart 7.3 Average Treatment Time Requirements for Basic Dental Care Needs by Area Program in 1991

(Age-Adjusted Minutes Needed Per Patient for Level I-III Care)

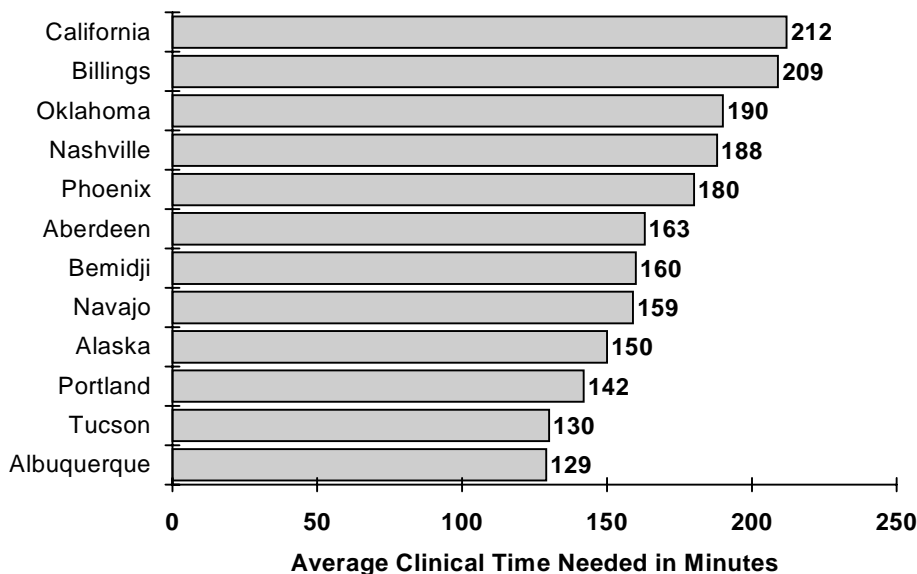


When the time requirements for only the basic care (Levels I-III) needs are compared among the Areas, the Tucson (148 min.), Navajo (148 min.), and Phoenix (146 min.) programs reported the highest need per patient. These values apparently result from the high rate of baby bottle tooth decay in these Areas and the severity of periodontal disease due to diabetes.

Most Area programs averaged roughly 2 hours (from 110 to 130 minutes) of basic care needed per patient. Much of the time requirement for basic care is repeated each year due to the need for periodic examinations and preventive services to maintain good oral health.

Chart 7.4 Average Treatment Time Requirements for Rehabilitative Dental Care Needs by Area Program in 1991

(Age-Adjusted Clinical Minutes Needed Per Patient for Level IV-VI Care Only, Excluding Orthodontics)



When the time requirements for rehabilitative care (Level IV-VI) needs are compared among the Areas, California (212 min.) and Billings (209 min.) had the highest rates, while Albuquerque (129 min.) and Tucson (130 min.) reported the lowest. The need for orthodontic care is excluded to provide a clear comparison of complex treatment needs, which are mainly among adult patients.

Other data (not shown) indicate the high rate of need in California resulted mainly from the treatment preferences of dentists there, rather than due to the severity of disease. For that reason, California's rate was reduced to 180 minutes for resource planning purposes.

Chart 7.5 illustrates that the dental care needs of adults require substantially more clinical time than do the needs of children. The patients categorized as symptomatic care users, those who seek dental care only when problems arise, averaged higher time requirements to meet their needs than did the routine care users. Symptomatic care users comprise from 20-40 percent of the patients seen in most IHS and tribally-managed programs.

To improve the oral health of a community, it is important to encourage patients to adopt a pattern of routine care use. Providing adequate access to routine care for symptomatic care users, particularly in remote areas, is essential to that effort.

Chart 7.6 shows that the high rate of decay in the primary teeth of preschool-aged Native American children has a substantial impact on the resource requirements of dental programs. In the 1991 IHS Patient Survey, the children aged 0-4 years who had Baby Bottle Tooth Decay (BBTD) averaged a 70 percent greater treatment time requirement (150 min.) than children without this problem (88 min.).

The large amount of clinical time needed annually to treat decay among young children means that dentists often must spend less time meeting the needs of older children and adults in some Native American communities.

Chart 7.5 Treatment Time Requirements for Dental Needs by Age and Pattern of Dental Care Use

(Average Service Minutes Needed Among Symptomatic Care and Routine Care Users in the 1991 IHS Survey)

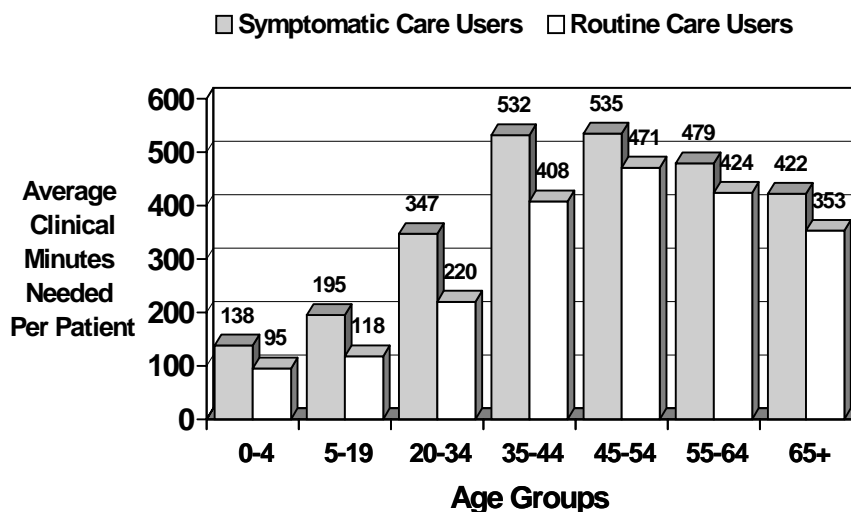
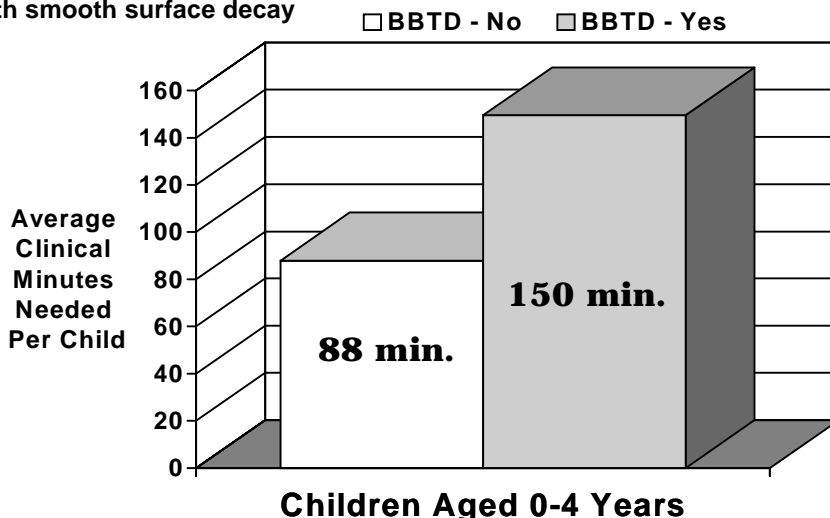


Chart 7.6 Treatment Time Requirements For Dental Needs Of Native American Children Having or Not Having Baby Bottle Tooth Decay (BBTD)

(Average Clinical Minutes Needed Among Patients Aged 0-4 Years Having the BBTD/Rampant Dental Caries Pattern in 1991)

BBTD = 2+ upper incisors with smooth surface decay



**Chart 7.7 Treatment Time Requirements
By Type of Dental Care Needed**
(Age-adjusted Average Clinical Minutes Needed
Per Patient Examined in the 1991 IHS Survey)

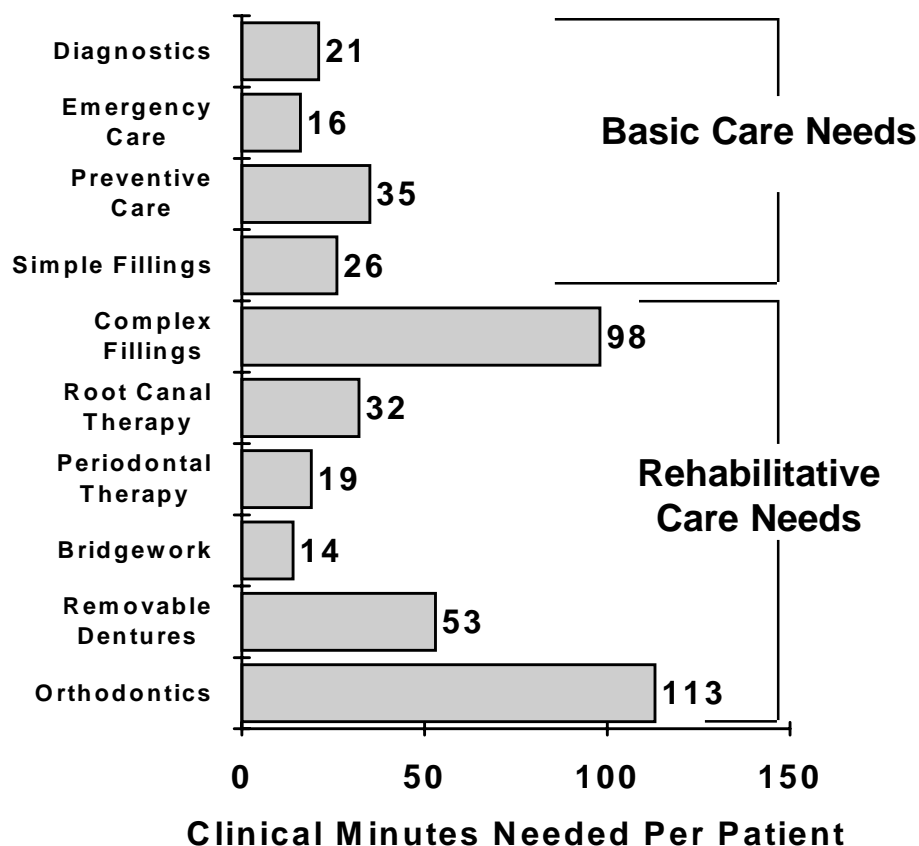


Chart 7.5 lists the distribution of the average time requirements for ten types of dental care. The per capita rate for all categories combined is 427 minutes (or over 7 hrs.) of treatment needed.

On average, the need for complex fillings (e.g., porcelain and metal crowns) and orthodontic care (braces), comprise almost 50 percent of the total treatment time required to meet all needs. Orthodontic care is generally a need among children and complex fillings are a need mainly among adults.

Diagnostic services (exams, x-rays) and preventive care combined (56 min) account for over 60 percent of the 98 minutes of clinical time required to provide all the basic dental care needs of the average patient. The average time needed for complex fillings alone (98 min) is equal to the time requirement for all basic care needs combined.

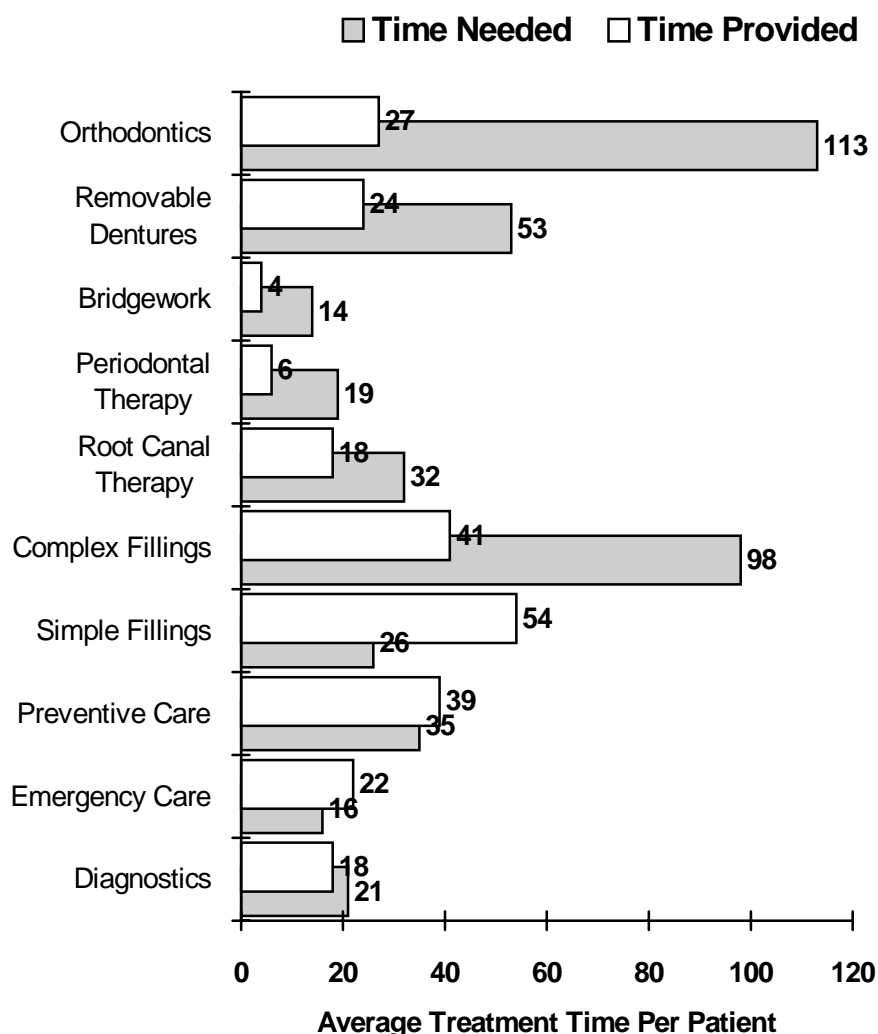
A Word About Average Treatment Time Requirements:

The average amount of treatment time required per patient for each type of care shown above does not represent the actual amount of time needed to provide care for a given patient. For example, the average treatment time required per patient for orthodontic care which has been age-adjusted to the entire population in Chart 7.7 is less than two hours (113 min.) . However, the actual amount of time it takes to provide orthodontic care to given a patient may take from 10 to 20 clinic hours over a period of several years.

Though the average per patient rate of need is associated with the rate of tooth decay and periodontal disease, access to care is an equally important factor which determines the amount of need in a population. Lack of adequate access over a period of years increases the severity of disease conditions and drives up the time and cost (resources) required to improve the oral health to patients who did not receive care when their needs were minimal.

Chart 7.8 Average Treatment Time Requirements Versus the Actual Time Provided by the Type of Dental Care Need

(Average Minutes Needed Per Patient and Average Minutes Provided to Native American Patients in 1991)



The comparisons shown in Chart 7.8 point out that, while many Native American patients receive the routine basic dental care they need, relatively few receive the full scope of rehabilitative care needed. Though some of these services can be provided by general dentists, much of the needed rehabilitative care is best provided by dental specialists. In order to provide these services in rural communities, more specialists are needed in all Area programs to provide care and to assist or train tribal and IHS dentists who can make rehabilitative care more accessible to Native Americans.

The Oral Health of Native Americans - An Indian Health Service 1991 Survey

Chart 7.8 compares treatment needs from the 1991 IHS Patient Survey with actual workload data reported by IHS and tribally-managed dental programs in 1991. The average number of treatment minutes required and the average minutes provided per patient are organized into ten major categories of dental care. The list begins with routine diagnostic services (exams, x-rays) and progresses to the most costly forms of treatment, including bridgework, dentures and orthodontic care.

This analysis reveals that a relatively small proportion of the treatment time needed for the more complex forms of care are provided by dental programs. Less than 1/2 the treatment time needed for complex fillings, root canal therapy, and dentures were provided to Native American patients in 1991. Additionally, less than 1/3 of the average clinical time needed for periodontal therapy and bridgework was provided, while less than 1/4 of the time needed for orthodontic care was provided to patients.

The time provided for simple fillings (54 min.) substantially exceeds the time needed (26 min.) for these services. This is because diseased teeth are often restored with less costly methods than the preferred complex fillings (i.e. gold crowns) due to the lack of resources available to many dental programs serving Native Americans.

PART 8. ORAL HEALTH OBJECTIVES FOR NATIVE AMERICANS

In 1992, important amendments to the the Indian Health Care Improvement Act (P.L. 94-437) were signed into law which may substantially affect the management of federal resources appropriated to Native American health programs. Among these amendments were 61 health status objectives proposed for achievement in all Native American communities, including urban populations. These Indian Health objectives are patterned after the *Healthy People 2000* national disease prevention initiative, published in 1991 by the U. S. Public Health Service. The new amendments call for progress toward each objective to be monitored for each tribe annually. The IHS is responsible to provide assistance to

tribes on developing monitoring methods which can be used to formulate the health program resource requirements to meet the objectives. The new law includes eight objectives for improving the oral health of Native Americans by the year 2000. Seven of these goals are presented and discussed on the following pages, using baseline data developed from the 1991 IHS Survey for each Area program. Alternative measures for monitoring progress are presented for some objectives to suggest practical options which all IHS and tribally-managed dental programs may choose to apply. The IHS dental data system has been modified to enable local programs to begin monitoring the oral health objectives in FY 1995.

Oral Health Objectives for Native Americans by the Year 2000

- #1 Reduce dental caries (tooth decay) so that the proportion of children with one or more caries (in permanent or primary teeth) is no more than 45 percent among children aged 6 through 8 and no more than 60 percent among adolescents aged 15.
- #2 Reduce untreated dental caries so that the proportion of children with untreated caries (in permanent or primary teeth) is no more than 20 percent among children aged 6 through 8 and no more than 40 percent among adolescents aged 14-15.
- #3 Increase to at least 50 percent the proportion of children who have received protective sealants on the occlusal (chewing) surfaces of permanent molar teeth (monitoring ages 6-8 and 14-15 year-olds).
- #4 Reduce the prevalence of gingivitis among individuals aged 35 to 44 to no more than 50 percent.
- #5 Reduce destructive periodontal disease to a prevalence of no more than 15 percent among individuals aged 35 to 44 years.
- #6 Increase to at least 45 percent the proportion of individuals aged 35 to 44 who have never lost a permanent tooth due to dental caries or periodontal disease.
- #7 Reduce to no more than 20 percent the proportion of individuals aged 65 and older who have lost all of their natural teeth.
- #8 Increase to at least 65 percent the proportion of the American Indian and Alaska Native parents and caregivers who use feeding practices that prevent baby bottle tooth decay.

Goal 8.1

Reduce Tooth Decay Among Children

Year 2000 Objective: Reduce the proportion of Native American children with dental caries in the primary and permanent teeth to no more than **45 percent** among children aged 6 through 8 years and no more than **60 percent** among adolescents aged 15 years.

The intent of this objective is to increase the number of children who are "caries-free", which means they have never experienced any tooth decay. In the 1987 NIDR survey of U. S. school children, only 53 percent of those aged 6-8 years, and 78 percent of the 15-year-olds had experienced any dental caries. The 1991 Area baseline data for Native American children are presented on Table 8.1 and the graphical comparisons on Chart 8.1. The teenage monitoring group includes 14- and 15-year-olds to enhance the sample size for making comparisons.

More than 80 percent of the 6- to 8-year-olds in almost every Area program had experienced tooth decay in their mixed dentition (primary and permanent teeth). The large deficiencies result from high decay rates in the primary teeth which occur very early in life, before most children first visit a dentist. Baby Bottle Tooth Decay (BBTD) is known to be a major factor (see Part 3). Thus, reducing decay in the mixed dentition depends principally on the collaborative efforts among all health care providers and others who interact with parents and care givers of infants and children.

Among children aged 14-15 in 1991, at least 90 percent had experienced dental caries in one or more teeth. Only the Tucson (72 %) and Bemidji (78 %) Areas had a deficiency of less than 20 percentage points above the 60 percent goal for the year 2000. The high proportion of children who have experienced dental caries by this age may reflect disease which was treated during the

years before protective sealants were used on many newly-erupted permanent teeth.

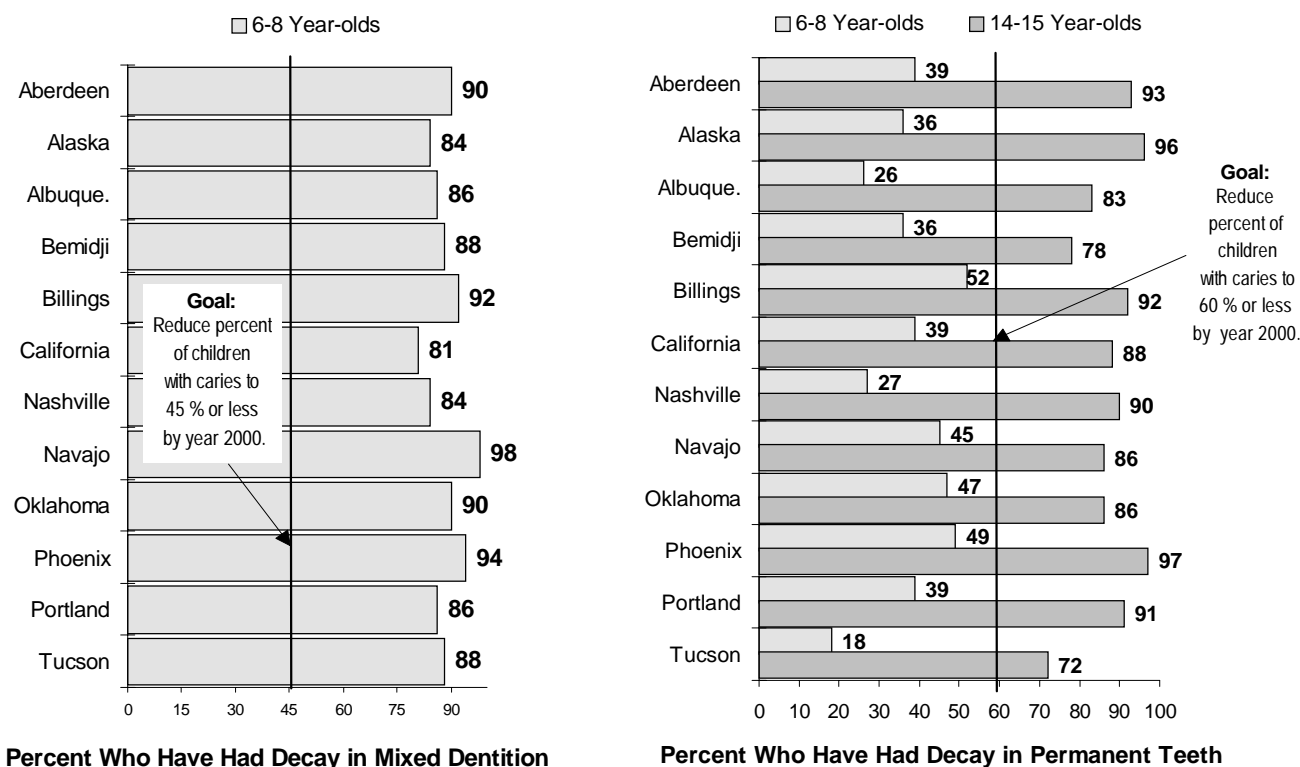
Since many of the children aged 6-8 in 1991 will be monitored as teenagers in the year 2000, the proportion having any caries (decay or fillings) in their permanent teeth is also presented in Table 8.1. It is encouraging that in 1991, the 6- to 8-year-olds in all Area programs were still within the 60 percent goal for teenagers. By emphasizing broad access to caries preventive agents, including community water fluoridation, protective sealants and the use of toothpaste and other fluoride-bearing products among children, it may be possible for most Area programs to achieve this goal by the year 2000.

Though the 1991 IHS Patient Survey indicates that dental caries rates among Native American children are improving, all IHS and tribally-managed dental programs must continue to dedicate a substantial portion of their available resources to preventing tooth decay each year. Rapid population growth will continue to be a large factor which will affect the amount of resources needed to prevent tooth decay. This is one reason community water fluoridation remains the most important disease preventive tool in Native American communities. All children can benefit from drinking fluoridated water without increased dental program costs. Preventive methods which must be used at a clinic require more resources; and, they do not reach the population which does not receive dental care.

**Table 8.1 1991 Area Program Baseline Data for Objective #1:
Reduce the Proportion of Children Having Any Tooth Decay**

Area Program	Age 6-8 Years	Caries in in Mixed Dentition	Caries in Primary Teeth Only	Caries in Permanent Teeth Only	Age 14-15 Years	Caries in Permanent Teeth
	N	Percent	Percent	Percent	N	Percent
Aberdeen	204	90	89	39	93	93
Alaska	365	84	81	36	184	96
Albuquerque	219	86	86	26	99	83
Bemidji	138	88	88	36	54	78
Billings	121	92	90	52	95	92
California	140	81	79	39	83	88
Nashville	113	84	83	27	57	90
Navajo	214	98	96	45	196	86
Oklahoma	226	90	85	47	100	86
Phoenix	160	94	89	49	121	97
Portland	167	86	81	39	140	91
Tucson	49	88	86	18	18	72
All Areas	2,116	88	86	39	1,240	90
IHS Programs	1,513	90	88	41	931	89
Tribal Programs	603	84	81	34	309	90

**Chart 8.1 1991 Area Program Comparisons for Objective #1:
Percent of 6-8 and 14-15 Year-olds Who Have Had Any Decay**



Goal 8.2

Reduce Untreated Tooth Decay Among Children

Year 2000 Objective: The proportion of Native American children with untreated tooth decay in primary and permanent teeth is no more than **20 percent** among 6- to 8-year-olds and no more than **40 percent** among adolescents aged 15 years.

While the first goal for Native American children is aimed at preventing dental caries, this objective focuses on treating the disease which has not been prevented. In 1987, only 27 percent of the U. S. school children aged 6-8 years and 23 percent of the 15-year-olds had experienced any dental caries (NIDR). The 1991 Area baseline data for Native American children are presented on Table 8.2. and the Area comparisons on Chart 8.2. Since the IHS survey data were collected at each patient's first dental visit during the year, it is assumed the rate of untreated disease reported for children is higher than would be expected if the data were collected during subsequent dental visits, after treatment is received.

As with goal 1, the 1991 baseline data for the mixed dentition of 6- to 8- year-olds in each Area program are discouraging due to the high decay rates in primary teeth. Thus, preventing rampant decay (i.e., BBTD) is an important part of reaching the goal for this age group. For 6-8 year-olds every Area has a deficiency of at least 40 percentage points above the year 2000 goal to have only 20 percent of the children with untreated decay.

Emphasis on the treatment of all diseased primary teeth among 6-8 year-olds may not be an effective use of resources since the "baby teeth" are starting to be replaced by permanent teeth. An effective way to reduce untreated decay in the primary teeth is to provide access to dental care for preschool-age children. By working closely with Head Start programs, dental programs can provide care during the time it is needed most .

Another way for dental programs to address the goal for 6- to 8-year-olds is to monitor untreated caries in the permanent teeth separately from the primary teeth. When only the permanent teeth are considered among the 6- to 8-year-olds, most Areas have less than a 15 percentage point deficiency above the 20 percent goal for that age. Thus, the 1991 baseline among the 6- to 8-year-olds is still within the 40 percent goal for when these children reach their teens (ages 14-15).

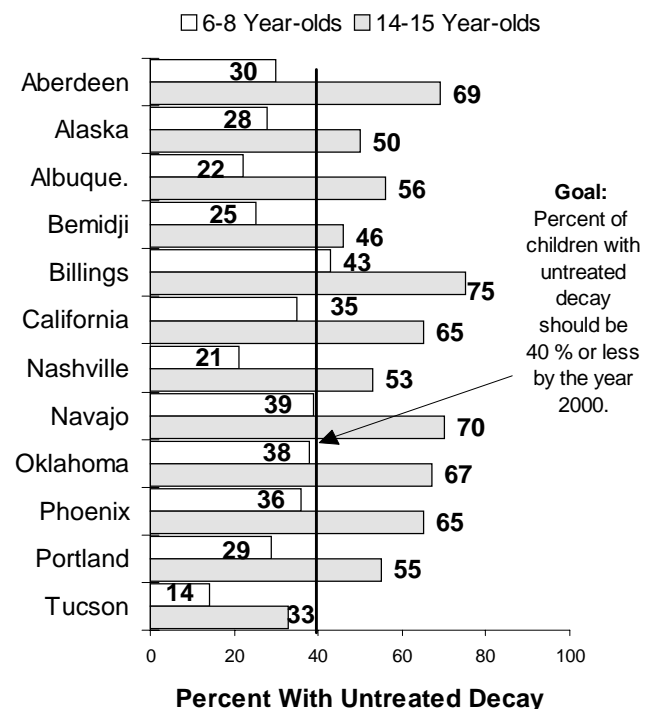
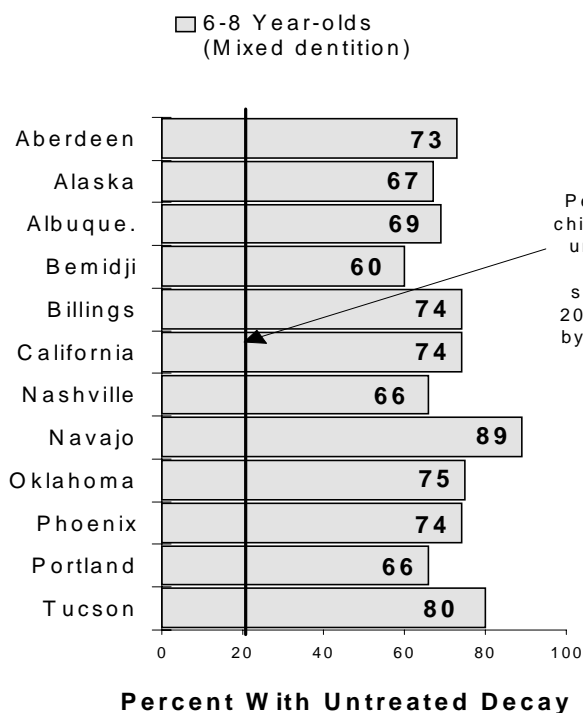
Baseline data for the 14- to 15-year-olds indicate that most Area programs reported more than a 20 percentage point deficiency above the 40 percent goal for this age. Unfortunately, it has proven difficult to provide care for children in this age group because teenagers often fail to make or keep appointments for fillings and other care.

Progress toward these goals may depend upon improving outreach activity with schools, Head Start centers, other institutions and individual parents to ensure access to health screening exams and referral for treatment each year. Effective dental screening and referral programs can keep children who develop serious tooth decay problems from "falling through the cracks" of overburdened dental programs. School-based screening programs enable many children to be examined as a group without consuming considerable time at the clinic. Only the children needing treatment are referred for dental appointments. Such programs can also give parents an opportunity to be involved with the planning of treatment and follow-up care for their children.

**Table 8.2 1991 Area Baseline Data for Objective #2:
Reduce Untreated Tooth Decay Among Children**

Area Program	Age 6-8 Years	Untreated Caries in in Mixed Dentition	Untreated Caries in Primary Teeth Only	Untreated Caries in Perm. Teeth Only	Age 14-15 Years	Untreated Caries in Permanent Teeth
	N	Percent	Percent	Percent	N	Percent
Aberdeen	204	73	65	30	93	69
Alaska	365	67	61	28	184	50
Albuquerque	219	69	64	22	99	56
Bemidji	138	60	55	25	54	46
Billings	121	74	66	43	5	75
California	140	74	68	35	83	65
Nashville	113	66	60	21	57	53
Navajo	214	89	83	39	196	70
Oklahoma	226	75	63	38	100	67
Phoenix	160	74	69	36	121	65
Portland	167	66	56	29	140	55
Tucson	49	80	80	14	18	33
All Areas	2,116	72	65	31	1,240	61
IHS Programs	1,513	74	66	33	931	64
Tribal Programs	603	68	62	26	309	52

**Chart 8.2 1991 Area Baseline Comparisons for Objective #2:
Percent of 6-8 and 14-15 Year-olds With Untreated Decay**



Goal 8.3

Increase the Use of Sealants on Permanent Molar Teeth

Year 2000 Objective: Increase the proportion of Native American children who have received protective sealants on the occlusal (chewing) surfaces of permanent molar teeth to at least **50 percent** at ages 6 to 8 and 15 years.

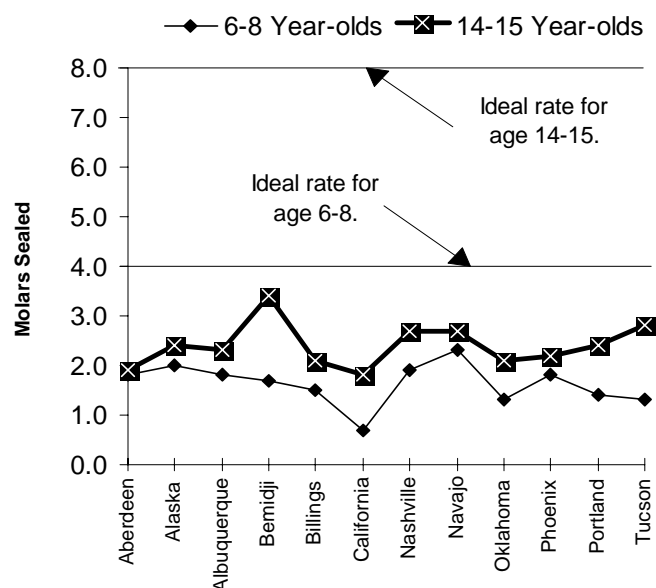
The use of plastic "sealants" to protect the chewing surfaces of newly-erupted teeth is an important strategy for meeting goals 1 and 2. In 1986, all IHS programs made a commitment to reach the 1990 U.S. Public Health Service objective for the Nation to provide protective sealants for at least 75 percent of the Native American school children by age 9 years. At that time fewer than 10 percent of the targeted dental patients were receiving sealants in IHS and tribally-managed clinics.

The 1991 Area baseline data regarding the year 2000 objective for sealants are presented in Table 8.3 and Chart 8.3. The data reveal an outstanding accomplishment made by all Area programs from 1986 to 1991. Among 6- to 8-year-olds, eight of the twelve Area programs, and among the 14- to 15-year-olds, all the Areas had surpassed the year 2000 goal of having at least 50 percent of the children (patients) receive sealants on one or more molars. Only one Area had a deficiency greater than 10 percentage points.

Despite this dramatic progress, decay in molars accounted for almost 80 percent of dental caries in permanent teeth of Native American children in 1991. Thus, further improvement might best be made by increasing the total number of molar sealants which children receive. Ideally, the number of sealants received by 6- to 8-year-olds would be 4.0 and the ideal number for 14- to 15-year-olds would approach 8.0, to include all first and second molars. For example, Chart 8.3a

presents the average number of molar sealants received per child in each Area program. The average number of molar sealants placed among all Area programs combined in 1991 was only 1.7 for 6- to 8-year-olds and 2.4 for the 14- to 15-year-olds. These figures could be substantially increased by the year 2000 if more local dental programs obtain the resources and training needed to provide sealants on a broad scale as new permanent teeth erupt each year. School-based sealant programs are an effective way to reach many children and make good use of program resources where this method is possible.

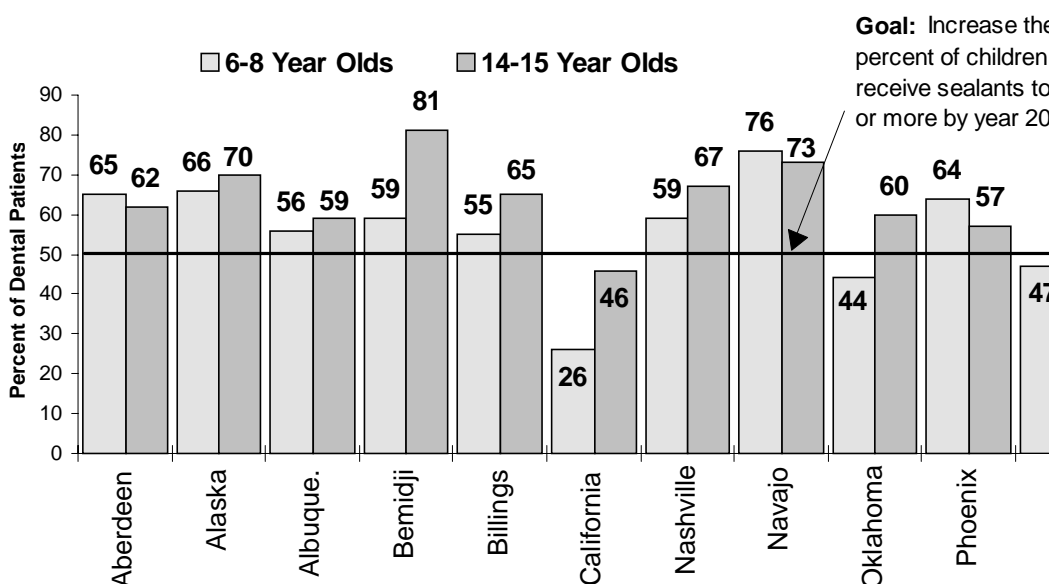
Chart 8.3a Average Number of Molars Sealed as of 1991 by Area Program



**Table 8.3 1991 Area Baseline Data for Objective #3:
Increase Percent of Children Receiving Preventive
Sealants On Permanent Molar Teeth**

Area Program	Age 6-8 Years	Children Having One or More Molars Sealed	1st Molars Sealed Mean	Age 14-15 Years	Children Having One or More Molars Sealed	1st Molars Sealed Mean	2nd Molars Sealed Mean	Total Molars Sealed Mean
	N	Percent	Mean		Percent	Mean	Mean	Mean
Aberdeen	144	65	2.8	93	62	1.5	1.5	3.0
Alaska	216	66	3.0	184	70	1.2	2.1	3.3
Albuquerque	159	56	3.2	99	59	1.9	2.0	3.9
Bemidji	87	59	2.8	52	81	2.3	1.9	4.2
Billings	82	55	2.7	95	65	1.4	1.9	3.3
California	92	26	2.9	82	46	2.0	1.9	3.9
Nashville	81	59	3.1	55	67	1.4	2.5	3.9
Navajo	148	76	3.0	195	73	1.8	1.9	3.7
Oklahoma	153	44	2.9	100	60	1.9	1.5	3.4
Phoenix	104	64	2.8	120	57	1.7	2.0	3.7
Portland	116	47	2.9	139	58	1.9	2.2	4.1
Tucson	19	47	2.8	18	72	1.8	2.1	3.9
All Areas	1,401	57	2.9	1,232	64	1.7	1.9	3.6
IHS	1,012	60	2.9	925	64	1.7	1.9	3.6
Tribal	389	49	3.0	307	63	1.6	2.2	3.8
Female	726	59	3.0	683	62	1.5	2.0	3.5
Male	675	55	2.9	549	66	1.9	1.9	3.8

**Chart 8.3 1991 Area Baseline Comparisons for Objective #3:
Percent of 6-8 and 14-15 Year-olds Who Have Received
Sealants On Any Permanent Molar Teeth**



Goal 8.4

Increase Adults With Acceptable Periodontal Health

Year 2000 Objective: The proportion of Native American adults who have gingivitis (inflamed gums) will not be greater than **50 percent** among persons 35-44 years of age.

Gingivitis is a common form of gum disease which can be eliminated by effective oral hygiene. A sign dentists use to detect gingivitis is the presence of bleeding when the gums are examined. Some 42 percent of U.S. employed adults aged 35-44 years were found to have gingivitis in 1985 (NIDR). Findings from the 1991 IHS Patient Survey on Table 8.4 indicate that over 90 percent of the adults in the 35-44 age group had gingivitis (bleeding in any part of the mouth). This figure is more than 40 percentage points in excess of the goal to reduce the proportion to 50 percent or less. The same level of deficiency was found among the 25- to 34-year-olds, who are a key age group for making progress toward this objective.

Because gingivitis alone is not a good predictor of destructive periodontitis which leads to tooth loss, an alternative measure of **adequate gingival health** was developed by the IHS to monitor progress toward this goal. Adequate health requires that at least half of the mouth be healthy (no bleeding) and that gum "pocketing", a sign of bone loss around teeth, is not present at all. Even when this measure is used, most Area programs in 1991 were over 35 percentage points deficient of the 50 percent goal in both age groups of adults.

Routine "self-care" by individuals, rather than periodic professional care, is believed to be the most cost-effective way to prevent and control gingivitis. However, effective oral hygiene habits can be hard to establish in a community living in relatively poor economic conditions, such as those found in many Native American communities. The findings on Table 8.4 also indicate that males,

diabetics and symptomatic dental care users have the worst gingival health. Moreover, it is difficult to attract and maintain these "least-healthy" patients in clinical preventive programs. Progress toward this health objective may hinge on providing broad public access to proven or innovative oral hygiene education and health promotion services among children, adolescents and adults, in the schools, the media and the workplace, as well as in the dental office. The long-term effectiveness of these measures will also be influenced by improvements in the economic status of Native American communities in the years ahead.

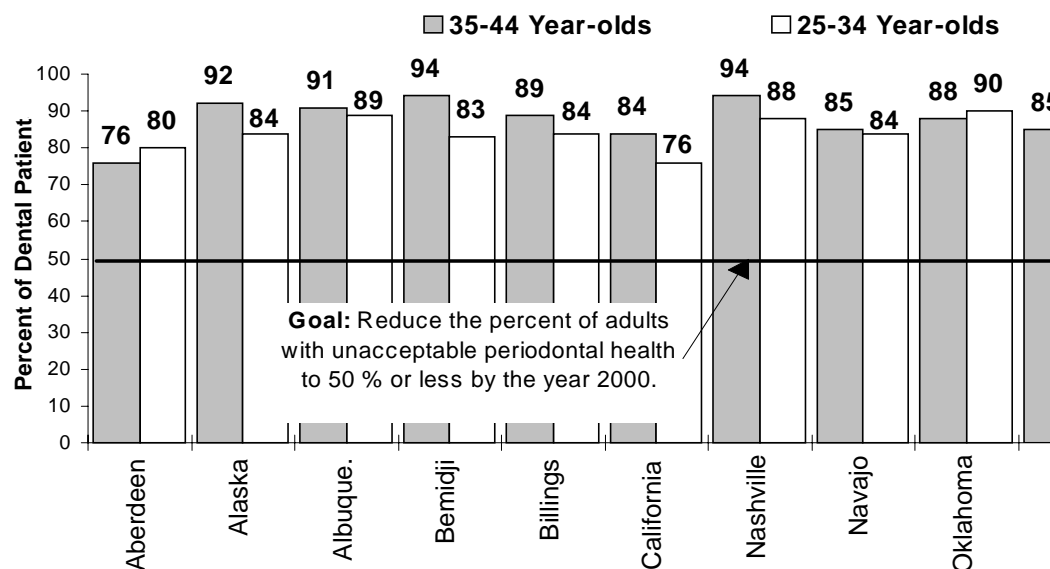
It is difficult to estimate the type and amount of resources needed to reach this goal in many Native American communities. Though self-care practices must be promoted as much as possible, a large proportion of patients will continue to need professional care to maintain adequate gingival health. Dental hygienists and trained auxiliaries, rather than dentists, must play a major role.

To conserve resources, policies are needed to help care providers determine which patients need professional services and how often they are needed, rather than have them attempt to clean the teeth of every patient on a regular basis. The Community Periodontal Index of Treatment Needs (CPITN) is used in many IHS clinics to assess the status of patients for this reason. Better tools for assessing patients are needed. Resources can then be focused on maintaining the health of patients with the highest risk of having serious gum disease, such as symptomatic care users and early diagnosed diabetics.

**Table 8.4 1991 Area Baseline Data for Objective #4:
Reduce Gum Disease (Gingivitis) Among Adults**

Area Program	Age 35-44 Years	Patients Having Any Gingivitis	Patients Not Having Adequate Gingival Health	Age 25-34 Years	Patients Having Any Gingivitis	Patients Not Having Adequate Gingival Health
	N	Percent	Percent	N	Percent	Percent
Aberdeen	262	96	76	331	94	80
Alaska	241	97	92	340	94	84
Albuquerque	289	98	91	333	96	89
Bemidji	177	99	94	257	95	83
Billings	258	97	89	239	96	84
California	211	93	84	241	91	76
Nashville	139	98	94	180	96	88
Navajo	491	96	85	608	95	84
Oklahoma	164	98	88	260	97	90
Phoenix	292	95	85	418	97	91
Portland	280	93	79	236	93	80
Tucson	35	100	97	46	100	98
All Areas	2,839	96	86	3,489	95	85
IHS Programs	2,207		85	2,614		86
Tribal Programs	632		90	875		82
Routine Care Users	1,910		83	2,122		81
Symptomatic Users	798		93	1,052		93
Diabetics	244		93	105		93
Non-Diabetics	2,528		86	3,301		84
Male	1,202		91	1,471		90
Female	1,637		83	2,018		81

**Chart 8.4 1991 Area Baseline Comparisons for Objective #4:
Adults Not Having Acceptable Gingival Health**



Goal 8.5

Reduce Destructive Gum Disease Among Adults

Year 2000 Objective: Reduce the proportion of Native American adults having destructive periodontal disease to no more than **15 percent** among persons 35 to 44 years of age.

Periodontitis involves the destruction of supporting bone around the teeth, causing pocketing which may lead to tooth loss. It progresses rapidly in some patients and very slowly in others. In the 1991 IHS Patient Survey, the prevalence rate of periodontitis was estimated using the CPITN scoring system, which classifies patients by the deepest periodontal pockets found in the mouth. Diabetics and other patients who have "pocketing" of their gums at a relatively early age (35 and under) are considered "high risk" patients. These patients form the most important group for making progress in controlling this disease.

Table 8.5 presents the 1991 Area baseline data for patients aged 35-44 and 25-34 years. These data indicate that, when any gum pocketing is used to estimate the proportion of adults with periodontitis (CPITN scores of 3 or 4), all Area programs have rates far above the 15 percent goal. However, when only "deep" pocketing (any CPITN score of 4) is used to estimate the proportion of these adults with disease, the rates range from a low of 12% in Portland to a high of 42% in Tucson. The proportion of diabetic patients with deep pocketing is significantly higher (34%) than the proportion of non-diabetics (19%) with advanced disease. Among those aged 25-34, the overall proportion with deep pocketing (12 %) indicates that most Area programs are still within reach of the 15 percent goal for the year 2000.

From a practical standpoint, it may be necessary for dental programs to monitor progress toward the objective by separating diabetic from non-diabetic patients, or by monitoring only the proportion of patients with deep pocketing.

Effective control of periodontitis requires adequate access to regular professional care and patient cooperation. Though the rate of deep pocketing appears within reach of the 15 percent goal, the large number of patients requiring care and the time required to provide conventional periodontal therapy are overwhelming in local programs which cannot meet the existing demand for dental care. Furthermore, in some Areas more than a third of the patients above age 35 are diabetic.

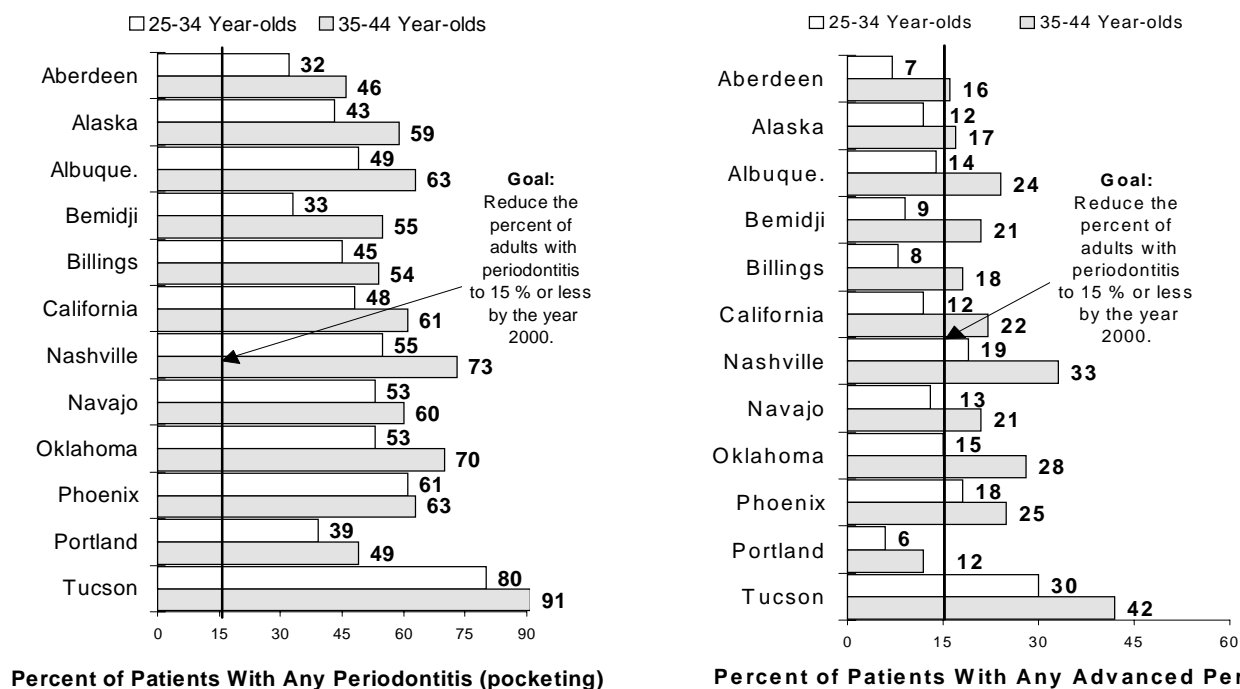
A goal of all periodontal therapy is to permanently improve the hygiene behavior of patients. This can frustrate care providers causing them to work mainly with compliant patients and to expend less effort on non-compliant patients, such as the symptomatic care users. Yet, progress in reducing periodontitis should be based on monitoring the improvement of patients who enter a dental practice with poor hygiene and other risk factors, in addition to increasing the number of healthy patients maintained in the practice each year.

As more Native American adults lose fewer teeth due to dental caries, the risk of periodontitis increases. Thus, the need for resources to provide periodontal care may increase as teeth stay in the mouth longer. Population growth also will increase the need for resources to provide care. Strategies to reduce periodontitis must emphasize access to care for adults who can benefit the most from professional therapy. This includes younger adults who are symptomatic care users or diabetics. New and more cost-effective preventive technologies and treatment methods should be explored to conserve the resources needed to address this growing health problem.

**Table 8.5 1991 Area Baseline Data for Objective #5:
Reduce Proportion of Adults Having Periodontitis**

Area Program	Age 35-44 Years	Patients with Any Pocketing (score of 3+)	Patients with Deep Pocketing (score of 4+)	Non- Diabetics With Deep Pockets	Diabetics With Deep Pockets	Age 25-34 Years	Patients with Any Pocketing (score of 3+)	Patients With Deep Pocketing (score of 4)
	N	Percent	Percent	Percent	Percent		Percent	Percent
Aberdeen	262	46	16	17	21	331	32	7
Alaska	241	59	17	17	33	340	43	12
Albuquerque	289	63	24	22	46	333	49	14
Bemidji	177	55	21	19	25	257	33	9
Billings	258	54	18	18	24	239	45	8
California	211	61	22	21	33	241	48	12
Nashville	139	73	33	31	44	180	55	19
Navajo	491	60	21	19	32	608	53	13
Oklahoma	164	70	28	25	36	260	53	15
Phoenix	292	63	25	22	33	418	61	18
Portland	280	49	12	10	17	236	39	6
Tucson	35	91	42	32	80	46	80	30
All Areas	2,839	59	20	19	34	3,489	48	12
IHS Programs	2,207	58	20					
Tribal Programs	632	62	22					
Males	1,201	68	28	27	39			
Females	1,638	52	15	14	30			
Routine Care Users	1,883	55	17					
Symptomatic Users	780	68	29					

**Chart 8.5 1991 Area Baseline Comparisons for Objective #5:
Percent of Adults Having Deep Periodontal Pockets**



Goal 8.6

Reduce Tooth Loss Among Adults

Year 2000 Objective: Increase the proportion of Native Americans who have never lost a tooth due to dental caries or gum disease to at least **45 percent** at 35 to 44 years of age.

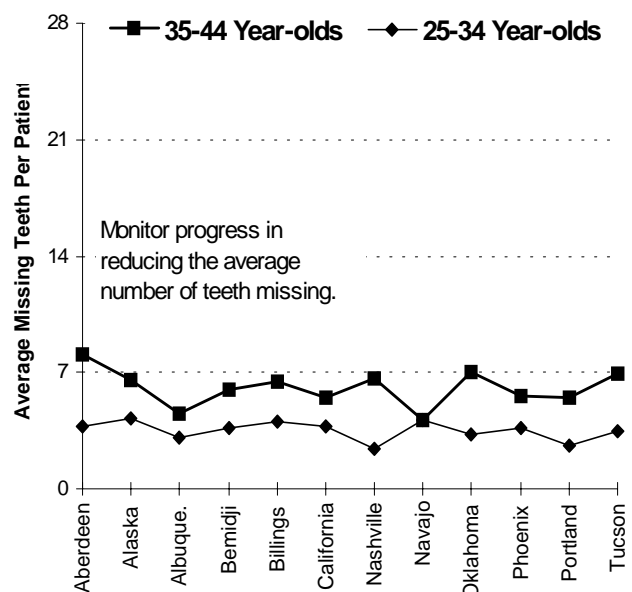
Tooth loss among adults generally reflects the consequences of untreated disease which progresses until extraction of teeth is necessary. It occurs when patients fail to seek treatment regularly or when underfunded community dental programs cannot provide adequate access to care for adults. In such cases, teeth must be extracted which otherwise might be saved. Unlike most forms of therapy that reduce a patient's dental needs, tooth loss creates an additional need for expensive rehabilitative care.

In 1985, the NIDR found that 31 percent of the U.S. adults aged 35-44 years had not lost any teeth to decay or gum disease. In 1991 only 20 percent of the Native American patients of the same age had not lost any teeth. This is not surprising since the resources allocated annually for improving the oral health of Native Americans have not kept pace with population growth or with the high disease rates found in most Areas. Chart 8.6 shows that all but one Area program is at least 20 percentage points deficient in reaching the 45 percent goal for the year 2000. The data on Table 8.6 also reveal that only 16 percent of the symptomatic dental care users and 12 percent of the diabetics patients had not lost any teeth.

Among the 25- to 34-year-old age group, where progress will be monitored, six Area programs have reached or were within 5 percent of the year 2000 goal. Thus, monitoring the proportion of patients who have never lost a tooth may not provide the best way to detect progress which dental programs make in saving teeth. Another

approach is to monitor changes in the average amount of tooth loss among patients. Therefore, the average number of missing teeth per patient in 1991 is presented on Chart 8.6a as another tool for monitoring this goal. This assumes that it is important for dental programs to reduce the average rate of missing teeth even if they are unable to reduce the proportion of patients who have a missing tooth. For example, more teeth may be saved by reducing the average number of missing teeth among adults from 5.8 to 4.0 than would be saved if the proportion of patients missing any teeth was increased by 15 percent. Progress may also need to be monitored separately among routine care users versus symptomatic care users and among diabetics versus non-diabetics.

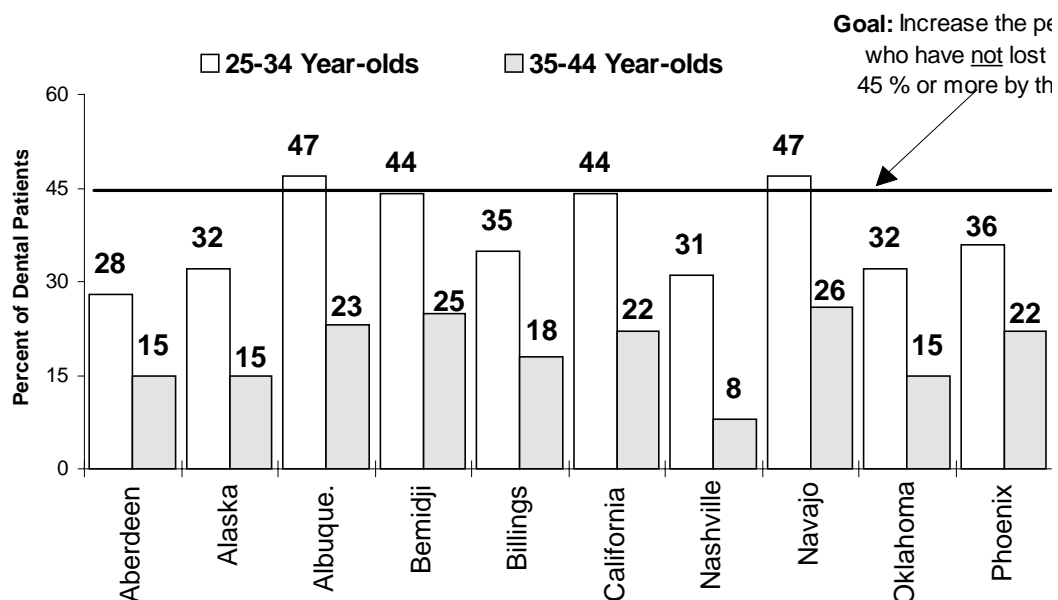
Chart 8.6a Average Teeth Missing Among 25-34 and 35-44 Year-olds by Area Program



**Table 8.6 1991 Area Baseline Data For Objective #6:
Adults Who Have Not Lost Teeth To Decay or Gum Disease**

Area Program	Age 35-44 Years	Never Lost a Tooth	Number of Teeth Lost	Age 25-34 Years	Never Lost a Tooth	Number of Teeth Lost
	N	Percent	Average		Percent	Average
Aberdeen	275	15	8.1	333	28	3.8
Alaska	246	15	6.5	345	32	4.2
Albuquerque	291	23	4.5	334	47	3.1
Bemidji	181	25	6.0	257	44	3.1
Billings	264	18	6.4	240	35	3.7
California	218	22	5.5	241	44	4.0
Nashville	144	8	6.6	180	31	3.8
Navajo	493	26	4.1	611	47	2.4
Oklahoma	168	15	7.0	264	32	4.1
Phoenix	299	22	5.6	418	36	3.3
Portland	285	22	5.5	239	41	3.7
Tucson	35	17	6.9	46	46	2.6
All Areas	2,899	20	5.8	3,508	39	3.5
Routine Care Users	1,954	22	5.4	2,252	43	3.3
Symptomatic Users	812	16	6.8	1,082	30	3.8
Diabetics	244	12	11.1	105	24	6.2

**Chart 8.6 1991 Area Baseline Comparisons for Objective #6:
Percent of Adults Who Have Not Lost a Tooth to Disease**



Goal 8.7

Reduce Edentulism Among Native American Seniors

Year 2000 Objective: Reduce the proportion of Native American adults who have lost all their natural teeth to no more than **20 percent** by age 65 years or older.

The loss of all natural teeth (edentulism) is a health problem for many older Americans. In 1985 the NIDR found that 36 percent of the U.S. adults aged 65 years and older were edentulous. When compared with earlier surveys, the rate of edentulism among U.S. adults of all ages has decreased over the past 25 years. In 1991, some 32 percent of the Native American patients aged 65 and older had lost all their teeth. Since edentulous seniors are not as likely to visit a dentist as those who have natural teeth remaining, the 1991 baseline data from dental patients may underestimate the actual rate of edentulism in many Native American communities. Even so, the overall rate of edentulism among elderly patients is substantially above the 20 percent goal for the year 2000.

Table 8.7 presents various baseline data for monitoring edentulism among seniors: 1) complete edentulism in both jaws, 2) edentulism in one jaw, 3) the rate of 1 and 2 combined, 4) the average number of remaining teeth among patients having any teeth, and 5) the percent of patients having 20 or more teeth remaining. Each of these measures can be useful to detect reduced edentulism and tooth loss among seniors, which the single measure of complete edentulism might miss.

Chart 8.7 shows that complete edentulism rates vary widely among the Area programs, from a high of 52 percent in Aberdeen to a low of 19 percent in California. The very low rate in the Tucson program is unreliable due to the small sample of seniors examined. Since relatively few

diabetics survive into their senior years, edentulism related to the high rate of diabetes among patients in the Tucson program is not apparent. Overall, the diabetic elderly have a much higher rate of edentulism (42%) than non-diabetic (26%) patients. In the 55- to 64-age group, the overall rate of edentulism (18%) is still within the 20 percent objective for the year 2000, though four Areas had complete edentulism rates above the goal.

Ironically, the very limited access to care available for Native American seniors during the past 30 years may have had some beneficial effect on the edentulism rates in some Area programs. When dentures cannot be provided to replace natural teeth, seniors are less likely to have their remaining teeth extracted to become edentulous. It is possible that, if access to rehabilitative dental care for seniors improves, the rate of edentulism among patients may temporarily increase, as more of the seniors seek to have missing or badly diseased teeth replaced with dentures. This factor may complicate the monitoring of progress toward the year 2000 goal among dental patients.

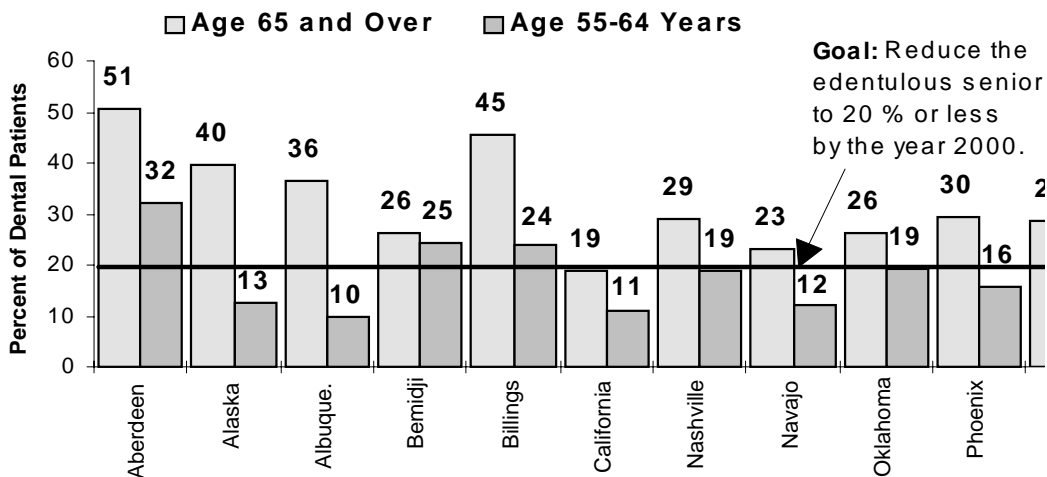
The prevention of edentulism begins by providing adequate access to routine dental care for all Native American adults. The large backlog of untreated disease among adult patients in 1991 will require substantially more resources than are currently available to each Area program. Little progress in reducing edentulism among seniors will be made unless the needs of younger adults can be met.

Table 8.7

1991 Area Baseline Data For Objective #7: Reduce Edentulism Among Seniors (Age 65+ Years)

	Age 65+ Group	Edent. in both Jaws	Edent. in Either Jaw	Combined Edent. Rate	Teeth Remaining Average	At Least 20 Teeth Remain		Age 55-64 Group	Edent. in both Jaws	Edent. in Either Jaw	Combined Edent. Rate	Teeth Remaining Average	At Least 20 Teeth Remain
Area Program	N	Percent	Percent	Percent	Average	Percent		N	Percent	Percent	Percent	Average	Percent
Aberdeen	103	51	11	61	16.0	16		115	32	20	52	14.7	23
Alaska	83	40	17	57	15.3	22		80	13	19	31	17.6	36
Albuquerque	66	36	6	42	15.0	23		102	10	7	17	18.2	36
Bemidji	61	26	30	56	14.9	28		49	25	27	51	16.3	35
Billings	75	45	19	64	14.3	20		101	24	18	42	16.2	28
California	80	19	16	35	16.9	35		72	11	13	24	18.4	44
Nashville	48	29	25	54	12.4	10		37	19	24	43	15.6	30
Navajo	87	23	13	36	15.2	25		141	12	9	21	18.4	45
Oklahoma	72	26	8	35	18.5	36		78	19	10	30	19.4	50
Phoenix	112	30	14	44	15.8	22		179	16	11	26	18.0	43
Portland	84	29	24	52	15.3	27		107	22	25	48	17.3	35
Tucson	19	5	32	37	15.6	32		15	7	20	27	16.0	33
All Areas	890	32	16	48	15.6	24		1,076	18	15	33	17.5	37
Females	486	34	18	52	15.3	22							
Males	404	30	15	44	15.9	27							
User Type													
Routine	544	32	18	49	15.8	26							
Symptomatic	278	26	15	41	15.1	22							
Diabetics	258	42	19	62	13.9	17							
Non-diabetics	587	26	15	41	16.3	28							

**Chart 8.7 1991 Area Baseline Comparisons for Objective #7:
Percent of Senior Patients Who Are Edentulous**



An Important Point to Bear in Mind:

Comparisons among the Area programs of the 1991 IHS Patient Survey findings provide a useful way to see some of the regional differences in the oral health status of Native Americans. This Chart Book presents a variety of descriptive graphs and tables for this purpose. However, when the findings are to be used for expressing the budgetary resource needs of each program, these simple comparisons are not adequate. This is largely because the relative size of each Area program's patient population must be factored into all resource planning formulas used by the IHS.

Readers should bear the "population size" factor in mind when considering the comparisons of regional findings presented in Part 7 and in Part 8. Though Part 8 presents "baseline data" for long-term oral health objectives in the same manner used in early sections, the findings are not comparable in terms of the health resources needed to address these objectives in each Area program.

In other words, several Area programs might have reported the same percentage point deficiency for a given health objective, but the population size of each program would also determine the total amount of resources needed in relation to the deficiency shown. For example, the Billings, Bemidji and Navajo programs may each be shown to be 15 percent short of reaching a health objective as of 1991, but the Navajo program would be likely to have the greatest resource need based upon its large and rapidly-growing population. Since specific resource planning formulas based on the objectives discussed in Part 8 have not yet been developed only the simple descriptive comparisons are presented.